# Environmental Impact Study - Proposed Anaerobic Digester at the Petawawa Water Pollution Control Plant

January 25, 2023

Prepared for:
Town of Petawawa

Cambium Reference: 11757-002

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# 1.0 Introduction

The Town of Petawawa is pursuing a Renewable Energy Approval (REA) to construct and operate an anaerobic digester at the Petawawa Wastewater Facility. Cambium Inc. (Cambium) was retained by the Town of Petawawa to conduct an Environmental Impact Study - Proposed Anaerobic Digester at the Petawawa Water Pollution Control Plant (Figure 1). A streamlined process is in place to coordinate legislative requirements set out by various ministries under the Green Energy Act. Applicants must meet the requirements outlined in Ontario Regulation 359/09 (i.e., the REA Regulation) under the Environmental Protection Act (EPA) to receive an REA.

The REA process considers natural heritage features and associated protection provisions during the design and implementation of renewable energy projects on private land and provincial Crown land in Ontario. The proposed project is located entirely outside of Crown land. Following the REA Regulation, the proposed bioenergy facility (i.e., anaerobic digester) is a renewable energy project that requires a Natural Heritage Assessment (NHA) in the form of an Environmental Impact Study (the Study).

This Environmental Impact Study (EIS) report, developed in accordance with Section 37 of the REA Regulation, has been prepared to:

- Describe the natural heritage features and their ecological functions, at and near the Project Location.
- Identify and assess any negative environmental effects of the project on a natural feature, provincial park, or conservation reserve.
- Identify mitigation measures for any negative environmental effects on a natural feature, provincial park, or conservation reserve.
- Describe how the Environmental Effects Monitoring plan addresses any negative environmental effects.
- Describe how the Construction Plan Report addresses any negative environmental effects.

This EIS evaluates the proposed changes to land use and how the changes could influence the interaction with natural features and their ecological functions. In particular, the function of ecological systems and natural features are considered as they relate to the surrounding natural heritage system.

This EIS report has been prepared in accordance with Section 7.0 of the Natural Heritage Assessment Guide (NHAG) for Renewable Energy Projects (MNR, 2012).

## 1.1 Summary of Proposed Development

The Petawawa Net Zero project (Project) will transform the Petawawa Water Pollution Control Plant (WPCP), ECA#A-500-3113268754, into a Resource Recovery Facility by upgrading its anaerobic digesters to digest an organic slurry along with wastewater solids and generate electricity with Combined Heat and Power (CHP). The purpose of the Project is to make the WPCP Net Zero in terms of energy use.

The modifications to the WPCP, all proposed within the confines of the perimeter fence of the facility, include;

- Improving the anaerobic digesters so they are compliant with an order from the Technical Standards and Safety Authority.
- Modifying the digesters so they can accept an organic slurry.
- Construction of concrete pads for placement of equipment (375 $m^2$).
- Addition of biogas cleaning and conditioning equipment.
- Installation of a CHP with a capacity of 200 kWe to generate electricity and heat.

There will be no change in land use as a result of the proposed upgrades to the WPCP. The footprint of the proposed changes will be entirely within the existing WPCP and will not encroach into natural heritage features (i.e., no direct impacts). However, the WPCP is located immediately adjacent to natural heritage features and thus, the proposed upgrades to the facility are within the 120 m setback to the wetlands and a watercourse.

## 2.0 Existing Environmental Conditions

Table 1 summarizes the natural heritage features at and near the Project Location.

**Table 1 Natural Heritage Features at and Near the Project Location**

| Specified Natural Heritage Features Following Section 38(1) of O. Reg. 359/09 | At the Project Location (Yes/No) | Near the Project Location (Yes/No) (i.e., within 120 m of the Project Location) |
|---|---|---|
| Is the Project Location in a provincially significant southern wetland or within 120 m of this feature type? | No. | No provincially mapped PSWs are present near the Project Location.<br><br>Yes, the wetlands present within 120 m of Project Location will be treated as PSWs to assess impacts of the proposed activity. |
| Is the Project Location in a provincially significant coastal wetland or within 120 m of this feature type? | No | No |
| Is the Project Location in or within 50 metres of an Area of Natural and Scientific Interest (Earth Science)? | No | No |
| Is the Project Location in or within 120 metres of an Area of Natural and Scientific Interest (Life Science)? | No | No |
| Is the Project Location in or within 120 metres of a significant woodland? | No | No |
| Is the Project Location in or within 120 metres of significant wildlife habitat (SWH)? | No | No |
| Is the Project Location in or within 120 metres of a Provincial Park? | No | No |

| Specified Natural Heritage Features Following Section 38(1) of O. Reg. 359/09 | At the Project Location (Yes/No) | Near the Project Location (Yes/No) (i.e., within 120 m of the Project Location) |
|---|---|---|
| Is the Project Location in or within 120 metres of a Conservation Reserve? | No | No |
| Are other natural features located at or within 120 m of the Project Location? | No | Yes. A permanent coldwater tributary of the Ottawa River is located north of the Project Location, within the 120 m setback. |

Natural Heritage features at and near the Project Location have been identified and described in detail within the Records Review Report (July 28, 2022) and Site Investigation Report (December 7, 2022) prepared by Cambium and available under separate cover.

## 2.1 The Renewable Energy Approval Regulation—Ontario Regulation 359/09

The REA Regulation outlines protected natural features and their specific development prohibitions and exceptions. Where two or more natural features overlap, the greater development prohibition applies. The following development prohibitions and exceptions for the Project are listed in Table 2.

**Table 2 Exceptions to Development Prohibitions and Exceptions for Natural Heritage Features at and Near The Project Location**

| Significant or Provincially Significant Natural Feature | General prohibition on development | Exception(s) based on EIS |
|---|---|---|
| Provincially significant southern wetlands | In feature or within 120 m setback | Development within feature and 120 m setback |

While not a provincially significant natural feature, a mapped unnamed watercourse is also located immediately north of the Project Location.

# 3.0 Description of Natural Heritage Features

## 3.1 Landscape Position and Topography

The Project Location is within the Ontario Shield Ecozone: Georgian Bay Ecoregion 5E, which is in south-central Ontario, extending southeast from Lake Superior to the central portion of the Ottawa River valley in the east, including Parry Sound, Perth, North Bay, Sudbury, and Sault Ste. Marie. This ecoregion is characterized by frequently exposed bedrock, shallow soils, and mixed forests representing the Great Lakes – St. Lawrence Forest Region (Lee, et al., 1998).

The Project Location is within a lowland area approximately 250 m west of the Ottawa River. Most of the Project Location and surrounding areas are relatively flat with little topographical relief. Lands north of the Project Location had a rolling topography. A steep slope was observed west of the Project Location along County Road 25 (i.e., Laurentian Drive). In general, the general topography descends gradually to the east, towards the shore of the Ottawa River.

## 3.2 Vegetation Communities

The vegetation communities at and near the Project Location are summarized in Table 3 and are mapped on Figure 1. A list of identified species and representative photos for each community are provided in Appendix D.

**Table 3 Vegetation Communities**

| No. | ELC Code | Community Description | Community Type | S - Rank |
|---|---|---|---|---|
| 1 | G057Tt | Dry To Fresh, Coarse: Oak Hardwood | Terrestrial | S5 |
| 2 | G131Tt | Maple Hardwood Swamp | Wetland | S5 |
| 3 | G149N | Organic Shallow Marsh | Wetland | S5 |
| 4 | G133Tt | Hardwood Swamp | Wetland | S5 |
| 5 | G135S | Organic Thicket Swamp | Wetland | S5 |

| No. | ELC Code | Community Description | Community Type | S - Rank |
|---|---|---|---|---|
| 6 | G057Tt | Dry To Fresh, Coarse: Oak Hardwood | Terrestrial | S5 |
| 7 | G134S | Mineral Thicket Swamp | Wetland | S5 |
| 8 | G131Tt | Maple Hardwood Swamp | Wetland | S5 |
| 9 | G130Tt | Intolerant Hardwood Swamp | Wetland | S5 |
| 10 | G054Tt | Dry to Fresh, Coarse: White Pine Mixedwood | Terrestrial | S5 |
| 11 | G029 | Dry, Sandy: Field | Terrestrial | S5 |
| 12 | G134S | Mineral Thicket Swamp | Wetland | S5 |
| 13 | G057Tt | Dry To Fresh, Coarse: Oak Hardwood Forest | Terrestrial | S5 |
| 14 | G058Tt | Dry to Fresh, Coarse: Maple Hardwood | Terrestrial | S5 |
| 15 | N/A | Sewage and Water Treatment Plant | Terrestrial | N/A |

The wastewater treatment plant and associated infrastructure occupy the entire Project Location. The Project Location includes wastewater infrastructure, parking areas, roadways, and buildings (Community 15). The grounds are maintained within the boundaries of the Project Location (Figure 1). A chain-link fence provides a physical separation between the Project Location and adjacent areas. The grounds within the facility consist of mowed lawn and are routinely maintained.

Lands near the Project Location, within 120 m, include cultural and natural vegetation communities. Cultural vegetation communities were created when the Wastewater Facility was constructed and are maintained by periodic mowing. A dry field community (G029), approximately 2.1 ha, is located east of the Project Location. The G029 community is mowed as a part of routine maintenance activities at the Wastewater Facility. A roadway extends from

Abbie Lane to access the property to the south. A power line corridor has been cleared and maintained west of Project Location and east of Laurentian Drive.

Natural vegetation communities near the Project Location, within 120 m, are primarily forested, with a few areas of open swamp and marsh. The Ottawa River is located approximately 250 m east of the Project Location.

A search for butternut (Juglans cinerea; provincially endangered) was completed as part of the vegetation survey; no butternut was identified. A search was completed for Cyperus houghtonii during the site investigation. The species was determined to be absent from the Project Location and the 120 m setbacks. **No rare vegetation communities or rare vascular plants were observed at or within 120 of the Project Location.**

## 3.3 Description of Natural Features—Wetlands

No wetlands were identified within the boundaries of the Project Location. The site investigation determined that wetlands present within the 50 m and 120 m setbacks were more extensive than provincial mapping indicated (Ministry of Natural Resources and Forestry, 2018). Provincial mapping did not designate the wetlands as Provincially Significant Wetlands (PSW).

Provincial mapping indicates the presence of two areas of mapped unevaluated wetland adjacent to the Project Location, at the northeastern and northwestern corners of the property. Site investigations revealed the presence of three areas of wetland adjacent to the Project Location, consisting of eight vegetation communities. These wetlands were distinguished from the surrounding plant communities based on the dominance of wetland vegetation (>50% relative cover), the presence of hydric soils (Soil Moisture Regime ≥5), topography (depression, shoreline), and the presence of standing water.

The wetland in the west of the Project Location consisted of a combination of Organic Shallow Marsh, Hardwood Swamp, and Organic Thicket Swamp (Communities 3, 4, 5; Table 3). Community 3 consisted of two areas of cattail (Typha spp.) marsh with standing water and saturated soils. It is noted that most of the powerline corridor consisted of marshland.

Community 4 was located in the margins of Community 3 and consisted of Eastern White Cedar, Red Maple, Black Ash, and Speckled Alder. Additional species included Common Labrador Tea, Common Winterberry, Sheep Laurel, and Sensitive Fern. Soils were soft and spongey, with an organic (Of/m) horizon that extended to a depth of 60 cm. The moisture regime was Moderately Wet (7) (Heck, et al., 2017). The water table was also observed at the soil surface. Community 5 was dominated by Speckled Alder, with little tree cover. Soils were moist with water observed at the soil's surface.

The wetland located south of the Project Location consisted of Hardwood Swamp communities (Communities 2, 8, and 9; Table 3). Where the wetland meets the shore of the Ottawa River, it transitions into a shrub-dominated thicket swamp (Community 12; Table 3). Community 2 was a deciduous swamp dominated by Red Maple, with Black Ash, Silver Maple, Common Winterberry, and Sensitive Fern associates. Community 2 transitioned into Community 9, which had a similar species assemblage but was dominated by Trembling Aspen. Silver Maple shared dominance with Red Maple in Community 8, with White Elm, Red Ash, and Sensitive fern associates. Soils consisted of a silty loam horizon that extended to a depth of 20 cm over silty fine sand. Mottles were observed at a depth of 20 cm. The soil moisture regime was Moist (5) (Heck, et al., 2017). Community 12 consisted of a band of shrub cover along the shore of the Ottawa River. The dominant species was Sweet Gale, with Cattails, Purple Loosestrife, Reed Canary Grass, and Sensitive Fern associates.

Communities 8 and 12 were also identified in the wetland located northeast of the Project Location on adjacent lands. This wetland area was separated from the wetland to the south by an area of Hardwood Forest (Community 13; Table 3). Soils were consistent with those observed in the wetland to the south and consisted of a silty loam horizon that extended to a depth of 22 cm over silty fine sand. Mottles were observed at a depth of 22 cm. The moisture regime was determined to be Moist (5) (Heck, et al., 2017). The wetland also included an area of thicket swamp (Community 7; Table 3). Shrub cover was sporadic in the thicket swamp but relatively dense in some locations, exceeding an overall cover of 25%. Species included Willow shrub species (Salix spp.), with cattails, Reed Canary Grass, Bullrush, and Sensitive Fern.

No rare vegetation communities or plant species were observed within or adjacent to the wetland habitats. No species at risk (SAR) plants were observed at or within 120 m of the Project Location.

The upgrades will be located within the setbacks to natural heritage features but will be located entirely outside of natural heritage features. The existing vegetation communities are tolerant to the operations of the WPCP. The existing vegetation communities are not ecologically sensitive to potential development effects that may arise from upgrades to the WPCP.

### 3.3.1 Modified Approach in Treating Wetlands as Provincially Significant

The NHAG recommends following Appendix C: Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects (MNR, 2012). This assessment process, established by MNR, provides a set of evaluation criteria which focus on wetland characteristics and ecological functions in the preparation of an Evaluation of Significance Report and completion of an Environmental Impact Study (EIS). The assessment is intended to be used when an applicant has decided to treat a wetland as provincially significant (Section 6.2.1). In these scenarios, the assessment process ensures that relevant wetland attributes are fully considered, and sufficient information regarding the wetland is generated by applicants to meet EIS requirements (Section 7).

The wetlands near the Project Location will be treated as significant for the purposes of the impact assessment and in generating associated mitigation measures.

The MNRF is not granting an exemption from the requirements of Appendix C of the NHAG (2012), but in the opinion of MNRF (see Appendix A of this report) the intent and criteria of Appendix C could be met due to the following project design factors and information and analysis provided in the EIS:

- For Phase ‘0’, all proposed development will be contained wholly within the fenced area of the existing facility, including all proposed new ground disturbance and potential negative environmental effects (i.e., sediment and storm runoff).

- The proposed ground disturbance and footprint expansion within the facility consists of ~375m2 of concrete pads to provide a solid base for generators and like equipment for facility operational requirements.
- Wetland features were identified within the 120m setback area, boundaries delineated, and vegetation communities discussed in the Site Investigation Report. Wetland boundaries are shown on Figure 1.
- The wetland features are not identified as provincially significant per MNRF approved data sources, were found to be more extensive than MNRF approved mapping sources had shown, and the option of assuming the wetlands to be provincially significant and submission of an EIS for MNRF review for the purpose of the Natural Heritage Report has been chosen to be pursued in accordance with requirements of the NHAG.
- The EIS will identify potential negative environmental effects of the proposed development on the wetland features within the setback area and propose acceptable mitigation measures, along with submit an operations and construction report for MNRF review.

The Project will need to prevent the following impacts to wetland during construction:

- Sediment leaving the work area during earth works, and
- high pH water leaving the work area during pouring of concrete pads.

The Natural Heritage Assessment process for REA projects has been developed to address a wide range of situations, especially greenfield sites. The Project Location is not a greenfield site but rather existing institutional land operating under a Certificate of Approval from the Ministry of Environment Conservation and Parks (MECP). The proposed updates to the facility will require short duration construction activities and will result in a small footprint. Given the existing land use of the Project Location and minor proposed upgrades, the wetlands near the Project Location will be treated as significant without using the full set of evaluation criteria listed in Appendix C of the NHAG. However, the impact assessment will consider the full range of potential negative environmental effects that may arise from the project and recommend mitigation measures to address these impacts.

In accordance with the NHAG, the wetlands are unevaluated and treating the wetlands as provincially significant for the purpose of MNRF's review of the NHA for a REA application does not affect the future status of the wetlands.

## 3.4 Description of Natural Features—Candidate Significant Wildlife Habitat

The project included a screening of significant wildlife habitat (SWH) that may be present on or adjacent to the Project Location. The results from the Records Review and Site Investigation reports were compared against the Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (MNRF, 2015). It was determined that SWH is not present on or within 120 m of the Project Location.

## 3.5 Description of Natural Features—Watercourse

A mapped unnamed watercourse, located north of the Project Location, was confirmed during the site investigations. This small permanent watercourse is a tributary of the Ottawa River and is the only watercourse located within 120 m of the Project Location. The watercourse does not flow through the Project Location but rather flows north of the 50 m and 120 m setbacks (Figure 1). The watercourse enters the property from the northwest, joining with the wetland area west of Abbie Lane. The watercourse flows east, across Abbie Lane via a culvert (twin 1.25 m corrugated steel pipe [CSP]). The watercourse then flows through another culvert (0.7 m corrugated plastic pipe) before flowing east into the wetland (Community 7) at the northeast property boundary before exiting the property. Off property, the watercourse then flows north through private property and meets the Ottawa River.

The watercourse was observed to contain flowing water during all site visits. The watercourse channel was well defined. Substrates were well-sorted and sandy with infrequent deposits of organic detritus. Several areas of coarse woody debris and debris dams were noted along the extent of the channel. Wetland species were identified along the watercourse banks, including Speckled Alder, Sensitive Fern, Spotted Joe Pye Weed, and Spotted Jewelweed. Sorted substrates and the presence of wetland vegetation indicates intermittent or permanent flowing conditions within the watercourse.

The thermal regime of both the unnamed watercourse and the Ottawa River is classified as coldwater according to the current Aquatic Resource Area Summary data from Land Inventory Ontario (Government of Ontario, 2015).

One Aquatic Resource Survey Point for the unnamed watercourse is present at the Abbie Lane culvert crossing, on lands within the 120 m setbacks to the Project Location. The subject survey point was collected in July of 2017 by an environmental consulting company (Government of Ontario, 2015). The following species were found at this location:

- Common Shiner (*Luxilus cornutus*)
- Northern Pike (*Esox lucius*)
- Northern Redbelly Dace (*Chrosomus eos*)

No barriers to fish passage were documented within the watercourse. The watercourse and the upstream wetlands (in the western portion of the site) likely provide suitable fish habitat for various species.

## 3.6 Ecological Linkages

The WPCP has a perimeter fence which extends around the entire facility. Fauna can freely move between communities located outside of the fence. However, the fence does not allow most species of fauna to enter the facility. Given the presence of the existing fencing, there is functionally limited ecological linkages between the existing facility and the adjacent natural heritage features. As well, most of the WPCP is mowed maintained grass which does not support the life process of most native fauna. As such, the project is not anticipated to result in negative impacts to ecological linkages at and near the Project Location.

# 4.0 Impact Assessment and Mitigation Measures

In accordance with the Natural Heritage Reference Manual, negative impacts means, degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple, or successive development or site alteration activities. The following section will assess the potential negative environmental effects that may result from this proposed renewable energy project and describe how those potential effects will be addressed through avoidance, mitigation, and monitoring.

## 4.1 Proposed Upgrades to the WPCP

The upgrades to the WPCP, all proposed within the confines of the perimeter fence of the facility, include;

- Improving the anaerobic digesters so they are compliant with an order from the Technical Standards and Safety Authority.
- Modifying the digesters so they can accept an organic slurry.
- Construction of concrete pads for placement of equipment (375 $m^2$).
- Addition of biogas cleaning and conditioning equipment.
- Installation of a CHP with a nameplate capacity of 200 kWe to generate electricity and heat.

This renewable energy project will be located entirely outside of natural heritage features but within the established setbacks from the following natural heritage features;

- Provincially Significant Wetlands (treated as significant)
- A permanent coldwater tributary of the Ottawa River, and associated fish habitat.

There will be no change in land use because of the proposed upgrades to the WPCP. The footprint of the proposed changes will be entirely within the existing WPCP and will not encroach into natural heritage features. The WPCP is located immediately adjacent to natural heritage features and thus, the proposed upgrades to the facility are within the 120 m setback

to the wetlands and a watercourse. No other natural heritage features protected by provincial policy or the NHA process were confirmed on or adjacent to the Project Location.

There will be no direct impacts within the wetlands or watercourse. The perimeter fence of the WPCP will exclude and prevent the entry of equipment and vehicles into adjacent natural heritage features. There will be no change to the wetland size, biological components, hydrology, or special features as a result of the proposed project. No in-water work will occur within the watercourse. The proposed construction and operation of the facility will not result in harmful alteration, disruption, or destruction (HADD) of fish habitat, or damage/destruction of the wetland, provided the mitigation measures are implemented (discussed below).

The following sections address potential negative environmental impacts that may result from the development of this renewable energy project, outside of natural heritage features, but within their setbacks as defined by the REA Regulation.

Mitigation measures and best management practices have been recommended to ensure that the integrity of the existing natural features is protected and/or enhanced and that the associated functions are not negatively impacted during or following construction.

## 4.2 Identification and Assessment of Potential Negative Environmental Effects

Table 4 provides an overview of potential negative environmental effects that may occur to natural heritage features during or after construction.

**Table 4 Potential Negative Environmental Effects**

| Natural Heritage Feature | Potential Negative Environmental Effects at the Project Location | Potential Negative Environmental Effects near the Project Location |
|---|---|---|
| Provincially Significant Wetland | No negative environmental effects are anticipated as this feature is not present at the Project Location. | • Deposition of sediment.<br>• Spill of a deleterious substance (i.e., spills of organic slurry during operations or fuels during construction). |
| Coldwater Tributary of the Ottawa River | No negative environmental effects are anticipated as this | |

| Natural Heritage Feature | Potential Negative Environmental Effects at the Project Location | Potential Negative Environmental Effects near the Project Location |
|---|---|---|
| | feature is not present at the Project Location. | • Discharge of high pH water from concrete pour operations and during concrete equipment washing.<br>• Introduction of invasive plant species. |

Construction activities will not physically encroach into adjacent natural heritage features as the perimeter fence that surrounds the facility will contain equipment, materials, and construction operations within the existing facility.

The operation of the WPCP is not anticipated to change from current operations. Thus, the operation of the facility post-construction is not anticipated to result in negative impacts to natural heritage features or resident flora and fauna. However, potential for negative environmental impacts does exist during the proposed temporary upgrades (i.e., during construction).

The potential negative environmental impacts that may arise from the proposed upgrades to the WPCP include:

- Release of sediment into the wetlands or watercourses during grading and site preparation activities. Sediment can alter the nutrient cycling within a wetland and can adversely impact watercourse substrates used by fish for spawning and feeding.
- Release of deleterious substances during a spill (i.e., a spill of diesel fuel during construction, or spill of organic slurry during operations) or discharge of high pH water during concrete pouring operations or cleaning equipment impacted by concrete. Deleterious substances can alter soil and water chemistry, which may result in negative impacts to local flora and fauna depending on the type, extent and concentration of the spill.

- Introduction of an invasive plant species from construction equipment or materials. Invasive species can out compete native plant species, reduce biodiversity and alter the structure of an ecosystem. Invasive plant species can create monocultures whereby they exclude native plants which are necessary for the life processes of native fauna.

Spills of organic slurry during operation of the WPCP could cause negative environmental effects if they entered the watercourse or wetlands. However, the organic slurry loading area will have a sump that will contain and collect any spills and prevent it from entering the watercourse and wetlands. On site staff at the WPCP will monitor operations during receipt of organic slurry materials. Thus, it is unlikely that the operation of the upgraded facility will result in negative environmental effects to the adjacent natural heritage features (i.e., the wetland, and watercourse). Also, it is unlikely that spills from equipment will release into the wetlands or watercourse because all equipment will be operated on a concrete pad or in a building. The concrete pad or building will form an impermeable barrier to contain spills for cleanup with a spill kit or appropriate materials relative to the type and extent of spill. In summary, spills of deleterious substances or organic slurry is unlikely to be released into adjacent natural heritage features.

Avoidance and mitigation measures are provided in Sections 4.3 and 4.4 to reduce or eliminate potential negative environmental effects that may arise during or post-construction.

The operation of the facility once constructed is not anticipated to result in negative impacts to natural heritage features located adjacent to the WPCP.

## 4.3 Avoidance Measures

The footprint of the proposed Phase 0 will be entirely within the existing fenced area of the facility and will not encroach into the wetlands, SWH, or the coldwater tributary. Thus, direct impacts to these natural heritage features will be avoided. The footprint will be located within the 120 m setback to these features. The following avoidance measures will maintain the existing form and function of natural heritage features adjacent to the Project Location:

- **Vegetation Removals**: The proposed upgrades to the facility do not require vegetation removals within natural heritage features (i.e., the PSW, or the watercourse). Avoiding vegetation removals within natural heritage features will maintain the thermal regime of the watercourse, and the natural processes within the wetland. The upgrades will be completed entirely within the CVI-3 community (i.e., a cultural, maintained, vegetation community). No encroachment is proposed into the vegetation communities adjacent to the Project Location. As no vegetation removals are proposed the project is not anticipated to negatively impact migratory birds that nest within trees and shrubs. The perimeter fence around the WPCP will act to prevent equipment from entering adjacent natural areas. This fence will be sufficient to protect the root zone of trees of trees growing in adjacent woodlands and wetlands. The fence will prevent equipment entry into natural heritage features, vegetation removals and soil compaction in natural heritage features. As such, avoiding vegetation removals will maintain the ecological form and function of these natural heritage features. This avoidance measure will prevent direct impacts to the wetlands, woodland, SWH and the watercourse.
- **Habitat Connectivity**: Maintain connectivity of habitats at and near the Project Location. All proposed works will be completed outside of natural heritage features. No vegetation removal is proposed for the WPCP upgrades. There will be no loss of habitat area or function. Habitat connectivity will be maintained between the watercourse, wetlands, and woodlands adjacent to the Project Location. As such, the proposed upgrades will maintain connectivity of habitats and will not result in habitat fragmentation or habitat alteration.
- **Wildlife Passage**: the existing facility is fully fenced. Wildlife will continue to move freely within the adjacent habitat types, outside of the fenced area. The proposed upgrades to the facility will not restrict wildlife movement patterns within adjacent natural heritage features. As such, the proposed upgrades will not result in negative impacts to the movement of flora or fauna adjacent to the Project Location.
- **Water Quality and Quantity**: The proposed concrete pads represent less than a 1% change in impervious ground cover at the Project Location. It is anticipated that post-

development water runoff, infiltration, and evaporation will be similar to pre-development conditions. It is not anticipated that the water balance will be negatively affected relative to the pre-development conditions. The post-development condition is not anticipated to result in negative impacts to water quality within adjacent natural heritage features. Impacts to water quality during construction, including during concrete pouring, will be discussed below. As such, the proposed facility upgrades are not anticipated to result in negative impacts to the adjacent provincially significant wetlands or the watercourse.

## 4.4 Mitigation Measures During Construction

Recommended mitigation measures should be included in the contract documents to identify actions the contractor must implement to prevent negative environmental impacts during the project. Ontario Provincial Standard Specifications (OPSS) are a standardized, consistent, and cost-effective item used by Owners and Contractors to direct the scope of work to be completed within a contract (OPS, 2022). OPSS reduces the time needed to prepare a contract document, provides a quality standard for work to be performed, and are easy to understand and implement during a project. OPSS, or similar contract elements, are recommended for inclusion in the contract documents as they provide standardized protection for the natural environment and contractors are familiar with following the intent of each document. The following mitigation measures are recommended to prevent negative environmental effects to adjacent natural heritage features:

- **OPSS 805 Temporary Erosion Controls** should be included in the contract package. The contract drawings should clearly demarcate the optimal location for the installation of sediment fence between the work area and natural heritage features. It is recommended that temporary erosion controls be installed and inspected prior to commencement of grading or earth moving works. Sediment fence and associated control measures should be inspected daily by the contractor and weekly by the owner's representative (i.e., the owner's Contract Administrator). Any deficiencies in sediment control measures should be repaired immediately to prevent sediment from entering the wetlands and watercourse.

- **OPSS 182 General Specification for Environmental Protection for Construction in and Around Waterbodies and on Waterbody Banks** should be included in the contract package. While in-water work is not proposed, the work will occur adjacent to the watercourse. As such, OPSS 182 contains constructions specifications to ensure the equipment, materials and methods of work prevent adverse impacts to the watercourse and fish habitat, and wetlands. In particular, all equipment used for work around the watercourse shall be at all times free of excess leaking fuel, lubricants, coolant and any other deleterious substances that could enter fish habitat. An emergency spill kit shall be kept on site to address any fluid leaks or spills from equipment. All spills should be reported to the Ontario Spills Action Centre either by phone (1-866-MOE-TIPS [663-8477] or online (https://www.ontario.ca/page/report-pollution-and-spills).
- The contract documents should identify best practices for concrete management to prevent impacts to the watercourse and wetlands. The Owner or the Owner's contract administrator should be present during concrete pouring events to document the following mitigation measures are followed during construction.
    - A concrete washout area for concrete-impact equipment shall be located at minimum 30 m from wetlands and the watercourse.
    - All concrete debris and concrete wastewater are to be collected within concrete-designated containment basin(s) and is not permitted to accumulate on site.
    - Cleaning of concrete-impacted tools, equipment, and vehicles (including concrete trucks and concrete pump truck) shall occur at the concrete washout location at least 30 m away from the wetlands and waterbody.
    - Concrete washout basin must be impermeable, leak-free, of sound and solid structure, and be of adequate size to accommodate more than the anticipated volume of concrete waste and concrete wastewater to be generated on site. Multiple containment basins may be used. All concrete washout basins are to be covered when not in use.

- Concrete waste basins are to be regularly emptied (or removed from site). Contents of concrete waste basins are to be disposed of offsite at a licensed facility.
- All concrete waste shall be transported in covered containment basins (for solids), or in a sealed, leak-free containment basin (for liquids).
- Any water which has come into direct contact with concrete fragments, wet slurry, and/or fines, must be managed as contaminated concrete-waste water, and collected (i.e., pumped), isolated (i.e., placed in sealed holding tanks) and disposed of appropriately at a licensed facility.
- Concrete forms shall be tight and monitored to ensure that no flow/leaks occur during concrete placement.
- When priming the pump truck delivery pipe, concrete discharge must be deposited into a designated concrete waste basin, and not deposited on the ground.
- All concrete testing shall be completed with use of impermeable liners and spill trays. Concrete waste and wastewater shall be disposed of within a designated concrete waste basin and not deposited on the ground.

- **OPSS 803 Construction Specification for Vegetation Cover** should be included in the contract package. OPSS 803 can be used to specify the temporary and permanent seed mixes that are to be applied post-construction to stabilize any areas of disturbed soils at the Project Location. Section 803.07.01.01 of this provincial standard specifies that the contractor shall prevent the spread of invasive species and noxious vegetation to, from and within the Working Area. It is recommended that the contractor follow the Clean Equipment Protocol for Industry to ensure that equipment and materials used during construction arrive to and leave from the work area free of invasive plant species.
- No vegetation removals are proposed. All contracts should stipulate when vegetation removals, pruning or limbing are permitted relative to bird species protected by the Migratory Birds Convention Act. It is recommended that the contract documents include a provision such that any vegetation removals, pruning or limbing be permitted from

September 1st to March 31st to avoid the period when most migratory birds are nesting within this nesting zone. If any vegetation removals, pruning or limbing are required during the period of April 1st to August 31st, an avian specialist should be retained to inspect the work area to ensure the proposed activities do result in negative impacts to a federally listed migratory bird species, their eggs or nests, in accordance with the regulations that support the Migratory Birds Conventions Act (1994).

- It is recommended that the Owner's contract administrator be present on the site as follows to document adherence to the recommended avoidance and mitigation measures:
  - The contract administrator should be present during concrete pouring events and during cleaning of concrete impacted equipment and tools.
  - The contract administrator should inspect ESC fencing and measures to ensure the are installed in accordance with the contract documents prior to equipment mobilization for earth moving or grading.
  - Periodic inspections should be completed to ensure ESC measures are in place, maintained and operating as intended. The inspections should be completed after significant rainfall events. Repairs or replacement of ESC measures should be completed within 24 hours of noting a deficiency.

## 4.5 Mitigation Measures During Operations of Facility

The Environmental Effects Monitoring Plan is detailed in Section 5.0 of this report to address potential negative environmental effects that may arise during operations of the facility and associated mitigation measures.

## 5.0 Environmental Effects Monitoring Plan

The REA Regulation requires that applicants prepare an Environmental Effects Monitoring Plan (EEMP) as a part of the Design and Operations Report to demonstrate how any negative environmental effects of the project will be mitigated, and to set out a program for ongoing monitoring of the effectiveness of mitigation measures. The EEMP is provided in the Petawawa Net Zero Facility Design and Operations Report (OCWA, 2022). The details of the environmental effects monitoring plan are provided in Table 5.

**Table 5 Environmental Effects Monitoring Plan Recommendations**

| Potential Negative Environmental Effect | Performance Objective | Mitigation Strategy | Proposed Monitoring and Contingency Measures |
|---|---|---|---|
| Spills of organic slurry may enter waterways or wetlands (low likelihood) | Spills will not reach waterways or wetlands | The organic slurry loading area is in an area with a sump that would collect any spill and prevent it from entering waterways or wetlands. The sump discharges to the head of the wastewater treatment plant.<br>Organic slurry will only be received during operating hours of the WPCP, so staff will be onsite to monitor for spills. | Organic slurry receiving will be monitored by WPCP staff.<br>If a spill occurs, flow of slurry will stop, and spills will be washed into the sump located in the slurry receiving area. |
| Odours from slurry reception or digestate loading may impact neighbouring residences (low likelihood) | No increase in odours over the current operation of the WPCP | Slurry is loaded from tanker trucks with a hose connection to the slurry receiving station. The slurry receiving station is a mump with a rock trap, which discharges to airtight digestors.<br>Digestate is loaded from the sludge storage tanks into tanker trucks using | Plant staff will monitor for excessive odours. Also, a complaint procedure is in place for neighbours to notify operations staff.<br>Contingency measures include ceasing digestate loading and slurry |

| Potential Negative Environmental Effect | Performance Objective | Mitigation Strategy | Proposed Monitoring and Contingency Measures |
|---|---|---|---|
| | | the existing truck loading arm and piping. Digestate is only loaded during land application periods, so it is not a constant source of odour. Approximately 20-30 minutes are needed to load a truck. Approximately 15-30 trucks are loaded per day over a total of four to eight weeks (depending on suitable weather) in the spring and fall. | offloading should excessive odours occur. Also, loading and offloading can be scheduled during times when prevailing winds are blowing away from neighbouring residences. |
| Spills from equipment may enter waterways or wetlands (low likelihood) | Spills will not reach waterways or wetlands | Equipment will be located on concrete pads or in buildings. Spills will be collected in sumps that send them to the headworks of the WPCP.<br>The WPCP has a comprehensive spills response plan set out in the Facility Emergency Plan (Appendix D of the Design and Operations Report (OCWA, 2022). | Equipment will be monitored by WPCP staff.<br>If a spill occurs, the source of the spill will be corrected and spills will be washed into sumps and returned to the headworks of the WPCP. |
| Odours from biogas emissions may impact neighbouring residences (low likelihood) | No odours from biogas | Odour mitigation strategies in the design include connecting the headspaces of all buffer tanks to the digester biogas headspace such that all odours and biogas will be transported to the biogas treatment system, which removes odours. | Plant staff will monitor for excessive odours. Also, a complaint procedure is in place for neighbours to notify operations staff.<br>Odour from biogas would indicate a leak in the piping or |

| Potential Negative Environmental Effect | Performance Objective | Mitigation Strategy | Proposed Monitoring and Contingency Measures |
|---|---|---|---|
| | | | equipment, which will be corrected immediately. |
| Air emissions from the CHP or emergency flare may impact neighbouring residences | Air emissions do not impact neighbouring residences | Emissions calculations and modeling were completed for the Emission Summary and Dispersion Modeling report, and process emissions do not exceed limits at the points of reception modeled.<br>Equipment will be maintained according to manufacturer recommendations to reduce the likelihood of equipment malfunctions that could increase emissions | Equipment malfunctions that cause an increase in air emissions will be shut down and repaired. |

## 6.0 Construction Plan Report

The REA Regulation requires that applicants prepare a Construction Plan Report to demonstrate how any negative environmental effects of construction or installation activities will be mitigated. The Construction Plan Report includes the avoidance and mitigation measures listed herein to address any potential negative environmental effects of the construction on adjacent natural features (OCWA, 2022). Table 6 provides a summary of the Construction Plan Report recommendations.

**Table 6 Construction Plan Report Recommendations**

| Potential Negative Environmental Effect During Construction | Mitigation or Avoidance Measure |
|---|---|
| Generation of solid waste during construction | Solid waste generated at the facility will be disposed of off-site at an approved facility |
| Vegetation removal within the fenced facility (i.e., removal of mowed lawn). | Disturbed areas will be restored with seed or sod. No encroachment into natural features is proposed. Areas where heavy equipment and vehicles are prohibited will be clearly marked and communicated to field staff. |
| Dust may be created during construction activities | Site clearing will be undertaken when wind speeds are low to minimize dispersal of dust. Water trucks will be available for dust suppression. |
| Stormwater runoff has the potential to transfer sediment to the watercourse and wetlands. | Silt fencing will be erected and maintained during the construction phase of the project. Straw bales will be placed in low lying areas to trap sediment transported by runoff. Periodic inspection of ESC measures will be completed to ensure they are maintained and functioning as intended. |
| Spills of deleterious substances could occur during the construction phase of the project | Heavy machinery and trucks will be fueled off-site or via a portable fuelling truck for on-site fuelling. Fuelling and maintenance activities will occur on flat surfaces away from ditches and migration pathways. On-site fuelling will be supervised by the truck |

| Potential Negative Environmental Effect During Construction | Mitigation or Avoidance Measure |
|---|---|
| | driver and heavy equipment operator to immediately detect any fuel release or spills.<br><br>A drip plan should be placed beneath Equipment during fuelling operations to contain excess fluids. Fuels, lubricants, and other deleterious substances will be stored in original containers in a locked storage area on site.<br><br>A spill kit will be located on site in the event of an accidental spill or release to contain deleterious substances. Any spill that reaches a water body surface will be reported to the Ontario Spills Action Centre and the Owner. |

## 7.0 Closing

In closing, potential negative environmental impacts associated with the proposed REA project are fully addressed using the recommended avoidance and mitigation measures. Provided these avoidance and mitigation measures are applied, the proposed project is not expected to result in negative environmental impacts on adjacent natural heritage features, including the PSW, watercourse, or SWH. The information presented herein demonstrates that the proposed development can be carried out in a way that will not adversely impact natural heritage and hydrologic features and function identified on or adjacent to the subject Site. Furthermore, the proposed development complies with applicable provincial policy.

Respectfully submitted,

**Cambium Inc.**

Matthew Wheeler, B.A. Hons.
Senior Ecologist / Project Manager

Brenden Hnatiw, B.Sc.
Technician

\\cambiumincstorage.file.core.windows.net\projects\11700 to 11799\11757-002 JDM Designworks - NHE - Petawawa STP\Deliverables\3. REPORT- EIS 2022\Final\2023-01-25 RPT EIS Petawawa Waste Water Treatment Facility.docx

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# 9.0 Glossary of Terms

ANSI: Area of Natural and Scientific Interest
ARA: Aquatic Resources Area
ARA: Aggregate Resources Act
AS: Agricultural System
ATK: Aboriginal Traditional Knowledge
BMA: Bear Management Area
BMP: Best Management Practice
CA: Conservation Authority
CEAA: Canadian Environmental Assessment Act/Agency
CFA: Canadian Forestry Association
CFIP: Community Fisheries Involvement Program
CFS: Canadian Forestry Service
CHU: Critical Habitat Unit
CH: Cultural Heritage
CLI: Canada Land Inventory
CLU: Crown Land Use
COSSARO: Committee on the Status of Species at Risk in Ontario
CR: Conservation Reserve
CWIP: Community Wildlife Involvement Program
CWS: Canadian Wildlife Service
DFO: Fisheries and Oceans Canada
EA: Environmental Assessment
EAA: Environmental Assessment Act
EAB: Emerald Ash Borer
EBR: Environmental Bill of Rights
EIA: Environmental Impact Assessment
EIS: Environmental Impact Study/Statement
ELC: Ecological Land Classification System
ELUP: Ecological Land Use Plan
END: Endangered species
EPA: Environmental Protection Act
ER: Environmental Registry
ESA: Endangered Species Act (2007)
ESA: Environmentally Sensitive Area
ESC: Erosion and Sediment Control
GIS: Geographic Information System
GLSL: Great Lakes – St. Lawrence
GPGGH: Growth Plan for the Greater Golden Horseshoe
GPS: Global Positioning System
HSA: Habitat Suitability Analysis
HIS: Habitat Suitability Index
KHA: Key Hydrologic Areas
KHF: Key Hydrologic Features
KNHF: Key Natural Heritage Features
LCFSP: Licence to Collect Fish for Scientific Purposes
LIO: Land Information Ontario
LRIA: Lake and Rivers Improvement Act
LUP: Land Use Permit or Plan
MA: Management Area
MAFA: Moose Aquatic Feeding Area
MCEA: Municipal Class Environmental Assessment
MECP: Ontario Ministry of Environment, Conservation and Parks
MNDMRF: Ontario Ministry of Natural Resources and Forestry
NER: Natural Environment Report
NHIC: Natural Heritage Information Centre
NHIS: Natural Heritage Information System
NHS: Natural Heritage System
OBM: Ontario Base Map
OFIS: Ontario Fisheries Information System
OLI: Ontario Land Inventory
OMAFRA: Ontario Ministry of Agriculture, Food and Rural Affairs
OWES: Ontario Wetland Evaluation System
PPS: Provincial Policy Statement (2014)
PSW: Provincially Significant Wetland
RLUP: Regional Land Use Plan
RMP: Regional Management Plan
R.P.F.: Registered Professional Forester
SAR: Species at Risk
SARO: Species at Risk in Ontario
SC: Special Concern species

F&W: Fish and Wildlife
FA: Fisheries Act (Federal)
FEC: Forest Ecosystem Classification
FMP: Forest Management Plan
FRI: Forest Resources Inventory
FWCA: Fish and Wildlife Conservation Act
GGH: Greater Golden Horseshoe
GHP: General Habitat Protection
SWH: Significant Wildlife Habitat
SWM: Stormwater Management
THR: Threatened species
TOR: Terms of Reference
TPP: Tree Preservation Plan
WIA: Woodlands Improvement Act
WMU: Wildlife Management Unit

# Appended Figures


# ENVIRONMENTAL IMPACT STUDY

ANAERGIA INC.
Petawawa Waste Water Facility
Petawawa, Ontario

## LEGEND

- Aquatic Survey Point (AS)
- Amphibian Survey Station (MMP)
- Bat Maternity Roost Survey Plot Points
- Existing Road
- Footbridge
- Culvert
- Field Verified Wetland Boundary
- Watercourse
- Drainage Feature (DF)
- Major Road
- Minor Road
- Vegetation Communities
- Wetland
- 50m Buffer
- 120m Buffer
- Project Location

**Notes:**
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources and Forestry or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

CAMBIUM
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## SITE NATURAL HERITAGE FEATURES

| | | | |
|---|---|---|---|
| Project No.: | 11757-002 | Date: | November 2021 |
| | | Rev.: | Janaury 2023 |
| Scale: | 1:4,500 | Projection: | NAD 1983 UTM Zone 17N |
| Created by: | DJL | Checked by: | MW |
| Figure: | 1 | | |

O:\GIS\MXDs\11700-11799\11757-002 JDM Designworks - NHE - Petawawa STP\2021-11 23 FIG 1 - Site Natural Heritage Features.mxd

# Appendix A
# Correspondence

## Matthew Wheeler

**From:** Kennedy, Adam (MNRF) <Adam.Kennedy@ontario.ca>
**Sent:** December 12, 2022 2:29 PM
**To:** Matthew Wheeler
**Cc:** Solomon, Lisa (MNRF); Aaron Law; Kennedy, Adam (MNRF)
**Subject:** FW: Petawawa Net Zero Project (Cambium File 11757-002)
**Attachments:** 2021-11-30 FIG 1 - Site Natural Heritage Features.pdf; 2022-10-07-MNRF Comments - Petawawa Net Zero REA Project - NHA Reports.pdf; 200902-GA-002 - REA - 22-10-03.pdf



Hi Matthew,

Thanks again for the chat on Friday to provide an update on the progress on the revisions to the Site Investigation Report for the Petawawa Net-Zero project.

Per your follow-up email (below – dated December 9, 2022) to request exemption from the requirements of Appendix C and Table 18 of the Natural Heritage Assessment Guide (NHAG, 2012) I can provide the following comments:

- MNRF will not require a full wetlands assessment per the requirements outlined in Appendix C and Table 18, but will require the following as part of the EIS submission
    - Rationale for why the proposed project is limited in scope and the above noted requirements are not necessary (i.e. same rationale provided in your email of December 9th is sufficient)
    - Additional details regarding how sediment and high ph water will be prevented from leaving the work site (i.e. a construction report).

Given the scope of the proposed work, the intent of the NHAG, and in the spirit of collaboration MNRF is okay with requiring less detail from what is outlined in the NHAG in Appendix C and Table 18. Please note, future submissions related to phases of the proposed project beyond the current submission may require a full evaluation per Appendix C and Table 18 as those submissions will be treated as separate from the proposal under MNRF review at this time for Phase 0.

When the reports are ready to be submitted to MNRF for review could you please ensure my colleague, Lisa Solomon, is cc'd to the submission as I will be off for a few days over the winter holidays.

I hope the above is clear. If not, please let me know.

Regards,

Adam

**Adam Kennedy**

**Regional Planner**
**Land Use Planning and Strategic Issues Section | Southern Region**
**Ministry of Natural Resources and Forestry**
**(705) 761-3374**
**Adam.Kennedy@Ontario.ca**

**From:** Matthew Wheeler <Matthew.Wheeler@cambium-inc.com>
**Sent:** December 9, 2022 1:21 PM
**To:** Kennedy, Adam (MNRF) <Adam.Kennedy@ontario.ca>
**Cc:** Solomon, Lisa (MNRF) <lisa.solomon@ontario.ca>; Aaron Law <ALaw@ocwa.com>
**Subject:** Petawawa Net Zero Project (Cambium File 11757-002)



Hi Adam,

**Site Investigation Report**

It was good to speak with you this morning (Dec. 9, 2022) about the October 7, 2022 MNRF comments. We have updated the Site Investigation Report to address these comments. We will re-submit this report for your review.

**Environmental Impact Study (EIS)**

No provincially significant wetlands are mapped on or adjacent to the project location. Cambium's field investigation confirmed more wetlands surrounding the Project than are mapped. Attached you will find figure 1 which outlines the field-verified wetlands. I have also attached the site plan / general arrangement drawing (GA-002) for your review to show the footprint of the upgrades. The site plan shows the approximate 375 m2 of concrete pads required to upgrade the existing Petawawa Water Pollution Control Plant (WPCP). All proposed changes will be within the confines of the facility. No encroachment into natural heritage features will be required. As the wetlands are located immediately outside of the existing perimeter fence of the WPCP, the proposed upgrades to the facility will be within the 120 m setback to the wetlands.

For the purposes of this Natural Heritage Assessment (NHA), the wetlands will be treated as provincially significant features. Following the NHA process, assuming wetland significance will omit the Evaluation of Significance Report and go directly to the EIS.

The NHAG recommends following Appendix C: Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects. This assessment established by MNR, provides a set of evaluation criteria focused on wetland characteristics and ecological functions relevant to the preparation of an Evaluation of Significance Report and completion of an EIS. The assessment is intended to be used where an applicant has decided to treat a wetland as provincially significant (Section 6.2.1). The assessment ensures that relevant wetland attributes remain fully assessed, and that sufficient information regarding the wetland is generated for applicants to meet EIS requirements (Section 7).

It's important to consider the site in the context of the REA process:

- The Project Location is an existing and operational Water Pollution Control Plant. The grounds are maintained.
- The property is fully fenced (i.e., the fence limits interactions between the fauna and the facility)
- There will be no encroachment into Natural Heritage features
- The footprint of the proposed upgrades amounts to 375 m2 of new concrete pads. This is a small scope of work within an existing developed area.
- The project will not result in negative impacts to the wetland (i.e., no change to wetland size, biological components, hydrology, or special features.)
- The operation of the digestor on site will not result in material changes to how the WPCP is currently operated.
- The project will need to prevent the following impacts to wetland during construction:

- sediment leaving the work area during earth works
- high pH water leaving the work area during pouring of concrete pads.

I'm seeking an exemption from using Appendix C for an assessment of wetland characteristics and functions as it is too in-depth relative to the proposed minor upgrades to this existing developed facility. I understand the REA has been developed to address a wide range of situations, especially greenfield sites. This is not a greenfield site. It is important to tailor the assessment process to the scope of work and existing conditions of a property. The EIS report will include an assessment of impacts on the wetlands but shouldn't need to follow Appendix C and Table 18 as it won't provide value in terms of impact assessment. Please let me know if you support this approach.

I'm hoping to hear back from you early next week (Dec 13), if possible, to allow Cambium to meet project timelines for submission of an EIS before the holidays. I appreciate your consideration of this request and look forward to collaborating with you.

If you have any questions, please email or call me at 613-876-1515

Kind regards, Matt Wheeler

**Matthew Wheeler**
Project Manager/Senior Ecologist

**Cambium - Kingston**

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866.217.7900
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**Happy Holidays From Cambium!**
Our offices will be closed from December 26 - December 30. We look forward to working with you in 2023 and hope you have a safe and happy holiday season.

Environmental | Building Sciences | Geotechnical | Construction Quality Verification

**Ministry of Natural Resources and Forestry**

Land Use Planning and Strategic Issues Section
Southern Region

Regional Operations Division
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Peterborough, ON K9J 3C7

**Ministère des Richesses naturelles et des Forêts**

Section de l'aménagement due territoire et des questions stratégiques
Region du Sud

Division des opérations régionales
300, rue Water
Peterborough (ON) K9J 3C7

January 17, 2023

Aaron Law, P.Eng.
Program Manager
Clean Water Agency
Sent via Email: ALaw@OCWA.com

Dear Aaron,

**SUBJECT: MNRF Comments re Site Investigation Report (revised) and Environmental Impact Study – Petawawa Net Zero Project**

Thank you for forwarding the revised Site Investigation Report dated (December 7, 2022) and Environmental Impact Study dated (December 19, 2022) on December 22, 2022, in support of the Petawawa Net Zero project *Renewable Energy Act* application.

Please find MNRF's comments below.

**Site Investigation Report**

1. Conversion of ELC Codes to Ecoregion 5E
   - Most ELC codes have been converted to EcoRegion 5E as requested, however, there are some instances where the codes have not been converted (e.g. Appended Figure / Vegetation Communities, Veg. Community 3 in Appendix A).
     - ***Comment:*** *please update the ELC Codes to EcoRegion 5E, where referenced throughout the Report*.

2. Reference to "northern wetlands" as applicable Natural Heritage Feature per REA Reg. 359/09
   - Per the REA Reg. 359/09, the definition of "southern wetlands" would apply to the project location. However, the Ontario Wetland Evaluation System: Northern Manual should be used for evaluation due to the project location being in EcoRegion 5E.
   - Section 2.2.2 has been revised to reflect the use of the Northern Manual as requested, however, Table 5 (pdf. p.37) identifies the natural heritage feature subject to assessment as "northern wetlands".

- ***Comment:*** *where applicable**,** please revise the applicable natural heritage feature subject to assessment to "southern wetlands" rather than "northern wetlands" throughout the Report but keep use of the Northern Manual references.*

**3.** MNRF notes the completion of breeding bird surveys in June 2022.
- ***Comment:*** *none*

4. MNRF notes the determination that there is no Significant Wildlife Habitat present within the project location and/or within the prescribed setback area.
- ***Comment:*** *none*
-

**<u>Environmental Impact Study</u>**

1. Section 3.3.1 and Appendix A
- To clarify, as there may be a misunderstanding regarding MNRF's guidance and direction per previous correspondence related to the requirements of Appendix C of the Natural Heritage Assessment Guide (2012). The MNRF is not granting an exemption from the requirements of Appendix C, but in the opinion of MNRF the intent and criteria of Appendix C could be met due to the following project design factors and information and analysis provided in the EIS:
    - For Phase '0', all proposed development will be contained wholly within the fenced area of the existing facility, including all proposed new ground disturbance and potential negative environmental effects (i.e. sediment and storm runoff).
    - The proposed ground disturbance and footprint expansion within the facility consists of ~375m$^2$ of concrete pads to provide a solid base for generators and like equipment for facility operational requirements.
    - Wetland features were identified within the 120m setback area, boundaries delineated, and vegetation communities discussed in the Site Investigation Report. Wetland boundaries are shown on Figure 1.
    - The wetland features are not identified as provincially significant per MNRF approved data sources, were found to be more extensive than MNRF approved mapping sources had shown, and the option of assuming the wetlands to be provincially significant and submission of an EIS for MNRF review for the purpose of the Natural Heritage Report has been chosen to be pursued in accordance with requirements of the NHAG.
    - The EIS will identify potential negative environmental effects of the proposed development on the wetland features within the setback area and propose acceptable mitigation measures, along with submit an operations and construction report for MNRF review.
        - ***Comment****: please revise Section 3.3.1 to exclude reference to the MNRF granting an exemption to the requirements of Appendix C of the NHAG, and remainder of the section where necessary to reflect the guidance of the MNRF per the clarification provided above.*
        - ***Comment:*** *please append this letter to Appendix A for future reference.*

    - The last paragraph of pdf. p13, in section 3.3.1, states "In accordance with the NHAG, while the wetland will be treated as significant for impact assessment purposes, the official status of the wetland, either as provincially significant or not significant, will not be changed."
        - ***Comment****: unevaluated wetlands do not have an "official" status. Please revise this paragraph to indicate the wetlands are unevaluated and treating the*

*wetlands as provincially significant for the purpose of MNRF's review of the NHA for a REA application does not affect future status of the wetlands.*

2. Reference to "northern wetlands" as applicable Natural Heritage Feature per REA Reg. 359/09
   - Per the REA Reg. 359/09, the definition of "southern wetlands" would apply to the project location. However, the Ontario Wetland Evaluation System: Northern Manual should be used for evaluation due to the project location being in EcoRegion 5E.
     - ***Comment:*** *please revise reference to "northern wetlands" as the applicable natural heritage feature throughout the report where appropriate (e.g. Table 5, pdf p.6 and Table 2 pdf p.7)*

***3.*** Appended Figure – Site Map / Vegetation Communities
   - ***Comment****: please revise the map to reflect ELC codes per EcoRegion 5E.*

***4.*** ELC code CVI-3.
   - ***Comment***: *The vegetation community code CVI-3 is from the 6E/7E ELC. Please remove this reference.*

If you have any questions or concerns, please feel free to contact me.

Best Regards,

Adam Kennedy

***Adam Kennedy***
*Regional Planner*
*Land Use Planning and Strategic Issues Section (LUPSI)*
*Southern Region*
*Ministry of Natural Resources and Forestry*

*(705) 761-3374*
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# Appendix B
# Site Plan

PRELIMINARY - NOT FOR CONSTRUCTION

H:\Anaergia\200902-0 - Petawawa - Phase 0\200902-0 - 06 - REA\200902-GA-001 - REA Site Plan - 22-09-28.dwg
2022-10-03

NORTH

STAGING AREA
370 SQ M

**GAS CONDITIONING AND CHP AREA**
**CONCRETE PAD w. (2) SUMPS 350M²**
**[PHASE 0]**

SITE ENTRANCE/EXIT

NEW FLARE

vessel w. carbon filter

60,82

7,5

REPLACE/EXTEND 100 BG LINE w. 200
BG LINE FROM DIGESTER 3/4 GALLERY
TO NORTH WALL OF BOILER BUILDING

BOILER BUILDING

OFFICE | GARAGE

(9,14) (9,14)

**DIGESTER 3 & 4 UPGRADE**
**[PHASE 0]**

D2 D1 D4 D3

DIGESTER D3 & D4 REFURBISHMENT
[PHASE 0]

(30,8)

EXISTING HYDRANT

SLUDGE 2 SLUDGE 1

RECEPTION EQUIPMENT IN EXISTING BUILDING
& CONTAINER/PAD MOUNTED EQUIPMENT FOR FOG
[PHASE 0]

(19,03) (18,97)

## SITE PLAN
SCALE: 1 : 500
ASSUMED EXISTING FEATURES

## LEGEND

- SITE SERVICING
- NEW FEATURE (PHASE 0)
- EXISTING FEATURE
- WATER FEATURE
- CONTOUR (0.25M)
- FLOOD PLAIN
- DIRECTION OF SURFACE DRAINAGE
- DIRECTION OF SWALE/DITCH DRAINAGE

## SITE SURFACE SUMMARY (SQ M)

| | EXISTING | PHASE 0 | | | TOTAL |
|---|---|---|---|---|---|
| SITE AREA | 42,800 | 0 | | | 42,800 |
| IMPERMEABLE SURFACES AND BUILDINGS | 10,570 | 125 | | | 10,695 |
| IMPERMEABLE SURFACES COLLECTED TO SUMP | 0 | 350 | | | 350 |

EXISTING TRUCK UNLOADING
CONTAINMENT PIT
35 SQ M

CHILLER PAD

## EXISTING UNLOADING AREA
SCALE: 1 : 100

| REV NUM | DESCRIPTION | DRWN BY | CHK'D BY | DATE |
|---|---|---|---|---|
| A | PRELIMNARY | SW | | 2022-09-14 |
| B | PRELIMNARY | WMcE | | 2022-09-28 |
| | | | | |
| | | | | |
| | | | | |

ATTENTION: 0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

Anaergia
Breaking Barriers to Sustainability

Rosebush Wilson
DESIGN AND PROJECT MANAGEMENT

DESIGNED:
DRAWN: SWilson
CHECKED:
APPROVED:
REFERENCE#:
PROJECT NO.: 200902
SCALE: AS NOTED

PETAWAWA

SITE PLAN ILLUSTRATING ONSITE SURFACES, FEATURES AND DRAINAGE

DRAWING NUMBER
GA-002
REV B

# Appendix C

# Ontario Provincial Standard Specifications

# GENERAL SPECIFICATION FOR THE MANAGEMENT OF EXCESS MATERIALS

## TABLE OF CONTENTS



## 180.01 SCOPE

This specification covers requirements for the management of excess materials.

Where the management of excess material requirements of other Ontario Provincial Standard Specifications differs from this specification, the requirements of this specification will take precedence.

### 180.01.01 Specification Significance and Use

This specification has been developed for use in provincial-oriented Contracts. The administration, testing, and payment policies, procedures, and practices reflected in this specification correspond to those used by the Ontario Ministry of Transportation.

Use of this specification or any other specification shall be according to the Contract Documents.

### 180.01.02 Appendices Significance and Use

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

## 180.02 REFERENCES

When the Contract Documents indicate that provincial-oriented specifications are to be used and there is a provincial-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.PROV, unless use of a municipal-oriented specification is specified in the Contract Documents. When there is not a corresponding provincial-oriented specification, the references below shall be considered to be to the OPSS listed, unless use of a municipal-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

**Ontario Provincial Standard Specifications, Construction**

OPSS 206 Grading
OPSS 209 Swamp Excavation

**Ontario Provincial Standard Specification, Material**

OPSS 1004 Aggregates - Miscellaneous

**Canadian and Provincial Statutes**

Environmental Protection Act, R.S.O. 1990, c.E.19 & R.R.O. 1990, Regulation 347
Transportation of Dangerous Goods Act, 1992, S.C. 1992, c. 34
Fire Protection and Prevention Act, 1997, S.O. 1997, CHAPTER 4

## 180.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

**Bituminous Pavement** means any combination of asphaltic material and aggregate, excluding asbestos modified asphaltic material.

**Commercial Waste** means waste described as commercial waste in Regulation 347, under the Environmental Protection Act, Ontario.

**Concrete** means concrete mixtures produced with Portland cement and may include blended hydraulic cement, supplementary cement materials, spent debris and silica sand abrasive blasting media from abrasive cleaning of concrete and reinforcing steel, and concrete brick and block and associated mortar. It may include embedded steel and excludes asbestos modified Portland cement concrete mixtures.

**Disposable Fill** means excess material other than that disposed of at a certified disposal site and that is managed in berms and mounds and as fill other than in road embankments.

**Earth** means earth as defined in OPSS 206.

**Excess Material** means material removed under the Work specified in the Contract Documents for which management is not specified and includes surplus and unsuitable materials.

**Fabricated Metal and Plastic Products** means metal and plastic products such as culverts, fence materials, and guide rails. It does not include containers, other packaging materials, storage tanks, septic tanks and ancillary equipment associated with sanitary sewage systems, septic systems, and fuel or lubricant dispensing and storage systems.

**Groundwater** means subsurface water and water that occurs beneath the water table in soils and rock formations that are fully saturated.

**Manufactured Wood** means wood that is not entirely natural wood.

**Masonry** means clay brick and associated mortar.

**Natural Wood** means stumps, trunks, branches, debris from tree and shrub removal, and wood products that are not treated, coated, or glued.

**Non-Hazardous Solid Industrial Waste** means waste described as non-hazardous solid waste in Regulation 347, under the Environmental Protection Act, Ontario.

**Re-Use** means using, processing, re-processing, or recycling of excess material into a construction material or other useful product and managed by these means for the Contract and other work.

**Rock** means rock as defined in OPSS 206.

**Subject Waste** means waste defined as subject waste in Regulation 347, under the Environmental Protection Act, Ontario.

**Swamp Material** means swamp material as defined in OPSS 209.

**Waste** means excess material that is not managed by re-use, open burning, or as disposable fill and includes any excess material.

**Waterbody** means waterbody as defined in OPSS 182.

## 180.04 DESIGN AND SUBMISSION REQUIREMENTS

### 180.04.01 Submission Requirements

#### 180.04.01.01 Notification of Site Selection, and Property Owner Release

A copy of the completed MTO form PH-CC-181, Site Selection Notification for Stockpiling Materials Managed Through Re-Use, or MTO form PH-CC-182, Site Selection Notification for Material Managed as

Disposable Fill or both shall be submitted to the Contract Administrator and the property owner at least two weeks prior to the use of the property. These forms are not required for property owned by the Owner or designated for use in the Contract Documents.

At the completion of such work, a completed copy of the MTO form PH-CC-183, Property Owner's Release, shall be provided to the Contract Administrator.

**180.04.01.02 Verification of Management by Disposal as Non-Hazardous Solid Industrial or Commercial Waste**

When excess material is managed by disposal as non-hazardous solid industrial or commercial waste, a copy of the weigh ticket or receipt provided by the disposal site operator shall be submitted to the Contract Administrator on a weekly basis. When such documentation is not available, written confirmation that the waste has been received shall be obtained from the operator of the disposal site and submitted to the Contract Administrator within two weeks after disposal activities are complete.

Within three weeks of the completion of all disposal activities associated with the work, a completed copy of the MTO form PH-CC-184, Waste Quantity Report, shall be submitted to the Contract Administrator and shall account for all excess material managed by disposal as solid non-hazardous industrial or commercial waste.

**180.04.01.03 Notification of Forest Resource Licensees**

Forest resource licensees identified in the Contract Documents shall be notified at least two weeks prior to commencement of open burning.

**180.04.01.04 Environmental Compliance Approval**

When Environmental Compliance Approval(s)/Certificates of Approval for a Waste Management System or a Waste Disposal Site are required, a copy of such approval shall be submitted to the Contract Administrator prior to transporting excess material or waste from the Working Area.

**180.04.01.05 Subject Waste Documentation**

For each subject waste specified in the Contract Documents that is being shipped from the Working Area to a waste disposal site, the following shall be completed:

a) The Contract Administrator shall be notified at least two weeks prior to the first shipment of subject waste, and at least 24 hours prior to each subsequent shipment of subject waste.

b) A Regulation 347 manifest with Part B completed by the carrier for each truckload of subject waste, shall be submitted to the Contract Administrator for Part A completion. Copies #1 and #2 of the manifest with Part A and B completed shall be retained by the Contract Administrator and the remaining copies #3 to #6 returned to the carrier.

c) Copy #6 of the Regulation 347 manifest shall be submitted to the Contract Administrator at the mailing address indicated on Part A of the manifest, within four weeks of the shipment of subject waste from the Working Area.

For each subject waste that is generated by the Contractor’s operations and that is not specified in the Contract Documents that is being shipped from the Working Area to a waste disposal site, the following documentation shall be submitted to the Contract Administrator.

a) Prior to shipment of the subject waste:

i. Test results from testing to determine the Regulation 347 waste class and characteristics of the subject waste from the Canadian Association for Laboratory Accreditation (CALA) accredited laboratory selected by the Contractor;
ii. Notification from the Ministry of the Environment and Climate Change (MOECC) Hazardous Waste Information Network (HWIN) of the registration of the subject waste to obtain a Regulation 347 Generator Registration Number (GRN); and
iii. A duplicate of Copy #2 of the Regulation 347 manifest with Parts A and B completed and signed by the generator and carrier respectively.

b) After shipment of the subject waste:

i. Notification of payment of all registration, manifest, and tonnage fees associated with the shipment from the MOECC HWIN;
ii. A duplicate of Copy #6 of the Regulation 347 manifest with Part C completed and signed by the receiver; and
iii. Notification of de-activation of the Regulation 347 GRN in the MOECC HWIN.

A record of all test sample numbers and sample dates shall be kept and submitted to the Contract Administrator upon request.

**180.04.01.06 Excess Material Audit or Inventory Document**

When an excess material audit or inventory is imposed by statute or is a condition specified in the Contract Documents, a copy of the audit or inventory documents shall be provided to the Contract Administrator.

**180.04.01.07 Alternative Management Condition Approvals**

When certain excess material is to be managed according to the conditions approved in writing by the local District office of the MOECC and such conditions differ from those specified in Table 1, a copy of such approval shall be submitted to the Contract Administrator at least two weeks prior to commencement of the work governed by the condition.

## 180.07 CONSTRUCTION

**180.07.01 Conditions on Management of Excess Material - General**

Management of excess material shall be as described in Tables 1 and 2 and the appropriate subsections of this specification, unless prior alternative management conditions are approved in writing by the MOECC.

When an excess material is a mixture of materials, it shall be managed in compliance with the most stringent conditions associated with any of the constituent excess material.

When excess material includes asbestos waste, the asbestos waste shall be managed as specified in the Contract Documents.

Excess materials shall not be permitted in waterbodies, and environmentally sensitive areas as identified in the Contract Documents, except when re-used according to the appropriate Ontario Provincial Standard.

**180.07.02 Conditions on Management by Re-Use**

Management of excess material by re-use for incorporation into the Work or for other designated re-use shall be as specified in the Contract Documents.

Management by re-use shall otherwise be outside the Owner's property.

Distance separations described in Table 2 do not apply for the following:

a) Re-use of excess materials for the same purpose.

b) Re-use of bituminous pavement, concrete, and masonry within a road right-of-way.

c) Re-use of concrete as aggregate in bituminous pavement.

d) Re-use of concrete as rip-rap, gabion stone, or rock protection according to the requirements of OPSS 1004.

Except cutting for construction purposes, excess material consisting of manufactured wood shall not be reprocessed.

**180.07.03 Conditions on Management as Disposable Fill**

Management of excess material as disposable fill, including sidecasting of swamp material, within the Owner's property and on other property designated in the Contract Documents shall be as specified in the Contract Documents.

Natural wood and debris from open fires may be managed as disposable fill only within a road right-of-way or on property with a boundary common to a road right-of-way, both within the Contract limits.

Such material shall be top covered by at least 300 mm of earth or topsoil.

**180.07.04 Conditions on Management by Open Burning**

Management of excess material by open burning is permitted only when specified in the Contract Documents. Where management by open burning is permitted, it shall be subject to the following conditions and conducted according to the Fire Protection and Prevention Act, 1997 where it applies, and with any applicable, local, municipal by-law(s):

a) A permit from the Ministry of Natural Resources and Forestry (MNRF) under the Fire Protection and Prevention Act, and/or applicable local or municipal by-law shall be obtained by the Contractor for open burning, as required.

b) Open burning is prohibited in areas subject to a restricted fire zone order as issued by MNRF or to a smog alert advisory as issued by MOECC.

**180.07.05 Conditions on Management by Disposal as Non-Hazardous Solid Industrial or Commercial Waste**

Management of excess material by disposal as non-hazardous solid industrial or commercial waste at receiving sites designated in the Contract Documents shall be as specified in the Contract Documents.

When receiving sites are not specified in the Contract Documents for management by disposal as non-hazardous solid industrial or commercial waste, such material shall be disposed of at sites identified by the Contractor.

Non-hazardous solid industrial or commercial waste shall be transported from the Working Area directly to a site that has an Environmental Compliance Approval/ Certificate of Approval for a Waste Disposal Site that is valid for non-hazardous solid industrial or commercial waste.

**180.07.06 Conditions on Management by Stockpiling**

Management of excess material by stockpiling within the Owner's property and on other property designated in the Contract Documents shall be as specified in the Contract Documents.

Stockpiling shall otherwise be outside the Owner's property.

Stockpiles of bituminous pavement, concrete, and masonry shall be separated according to Table 2 unless either of the following occurs:

a) Stockpiles are located within a road right-of-way or on property with a boundary common to a right-of-way, both within the Contract limits for a period not exceeding 120 Days.

b) Stockpiles are located within a provincial or municipal works yard or in a commercially licensed pit or quarry.

For all other excess materials, where Table 1 indicates that stockpiling is subject to management conditions in Table 2, such management conditions shall only apply to stockpiles that are to be in place for a period exceeding 120 Days.

**180.07.07 Conditions on Management by Disposal as Subject Waste**

When an excess material is identified as a dangerous goods waste, or a subject waste specified in the Contract Documents, management shall be as follows:

a) Subject waste shipments shall be manifested and transported directly to a certified waste disposal site.

b) When the subject waste is also a dangerous good as defined in the Transportation of Dangerous Goods Act (TDGA), the carrier shall provide all necessary TDGA labels and placards.

When an excess material generated by the Contractor’s operations may be subject waste and it is not specified in the Contract Documents, the Contractor shall be responsible to manage it according to the following:

a) Conduct sampling and testing using a laboratory certified by the CALA selected by the Contractor to determine whether it is subject waste and to determine the Regulation 347 waste class and characteristics.

b) Register all subject waste in the MOECC HWIN and obtain a Regulation 347 GRN for disposal.

c) Package and label all subject waste for transportation and disposal.

d) Arrange for shipment of all subject waste to a certified waste disposal site using a certified carrier.

e) Complete Part A of a Regulation 347 manifest including the GRN obtained from the MOECC HWIN and provide the manifest to the certified carrier for completion of Part B.

f) Provide a duplicate of Copy #2 of the Regulation 347 manifest to the Contract Administrator with Parts A and B completed and signed.

g) Pay all registration, manifest and tonnage fees associated with subject waste disposal in the MOECC HWIN.

h) De-activate the GRN in the MOECC HWIN after shipment of all subject waste to a certified waste disposal site is complete and acceptance of the subject waste is acknowledged by the receiver completing and signing Part C of the Regulation 347 manifest.

i) Provide a duplicate of Copy #6 of the Regulation 347 manifest to the Contract Administrator upon receipt from the receiver.

When an excess material is tested and found not to be a dangerous good waste or a subject waste, it shall be managed by disposal as Non-Hazardous Solid Industrial or Commercial Waste according to this specification.

## 180.10 BASIS OF PAYMENT

Payment for the management of excess material shall be included in the tender items requiring such management and shall include all costs associated with acquiring approvals, releases, and agreements.

Payment for the management of excess material that is subject waste generated by the Contractor's operations and not specified in the Contract Documents by the Owner, and is in addition to the cost of disposal as non-hazardous, solid industrial, or commercial waste, shall be administered as a Change in the Work, with provisions subject to testing to verify that the excess material is subject waste.

**Table 1**
**Excess Material Management Conditions**

| EXCESS MATERIAL DESCRIPTION | Subsection in This Specification | | | | |
|---|---|---|---|---|---|
| | **Conditions on Management by Re-Use** | **Conditions on Management as Disposable Fill** | **Conditions on Management by Open Burning** | **Conditions on Management by Disposal as Non-hazardous Solid Industrial or Commercial Waste** | **Conditions on Management by Stockpiling** |
| EARTH | Yes | Yes | n/a | Yes | Yes |
| SWAMP MATERIAL | Yes | Yes TABLE 2 | n/a | Yes | Yes TABLE 2 |
| AGGREGATE | Yes | Yes | n/a | Yes | Yes |
| ROCK | Yes | Yes | n/a | Yes | Yes |
| BITUMINOUS PAVEMENT | Yes TABLE 2 | Not Permitted | n/a | Yes | Yes |
| CONCRETE | Yes TABLE 2 | Not Permitted | n/a | Yes | Yes |
| MASONRY | Yes TABLE 2 | Not Permitted | n/a | Yes | Yes |
| MANUFACTURED WOOD | Yes | Not Permitted | Not Permitted | Yes | Yes TABLE 2 |
| NATURAL WOOD | Yes | Yes TABLE 2 | Yes | Yes | Yes TABLE 2 |
| DEBRIS FROM OPEN FIRES | n/a | Yes TABLE 2 | n/a | Yes | Yes TABLE 2 |
| METAL/PLASTIC POLYSTYRENE PRODUCTS | Yes | Not Permitted | Not Permitted | Yes | Yes |
| SUBJECT WASTE | Subject waste shall be managed as specified in the subsection for Conditions on Management by Disposal as Subject Waste. | | | | |
| MATERIALS SUSPECTED OF BEING CONTAMINATED | When excess materials that were not generated by the Contractor's operations and are not specified in the Contract Documents, are suspected of being contaminated, direction on their management shall be obtained from the Contract Administrator. | | | | |
| OTHER MATERIALS | Excess materials that are not listed above shall be managed as specified in the subsection for Conditions on Management by Disposal as Non-Hazardous Solid Industrial or Commercial Waste, unless prior alternative management conditions are approved in writing by the MOECC. | | | | |

**Table 2**
**Excess Material Management Distance Separation Requirements**

| Adjacent Feature | Minimum Distance Separation |
|---|---|
| Groundwater | 2 m (Above) |
| Waterbodies | 30 m |
| Water Wells | 100 m |
| Residences | 100 m |

**Appendix 180-A, November 2016**
**FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

**Note: This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.**

## Designer Action/Considerations

No information provided here.

## Related Ontario Provincial Standard Drawings

**No information provided here.**

# GENERAL SPECIFICATION FOR ENVIRONMENTAL PROTECTION FOR CONSTRUCTION IN AND AROUND WATERBODIES AND ON WATERBODY BANKS

**TABLE OF CONTENTS**



## 182.01 SCOPE

This specification covers the environmental protection requirements and mitigation measures that apply to construction involving work in and around waterbodies and on waterbody banks.

## 182.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

**Ontario Provincial Standard Specifications, Construction**

OPSS 517 Dewatering
OPSS 803 Vegetative Cover
OPSS 804 Temporary Erosion Control
OPSS 805 Temporary Sediment Control

**Canadian and Provincial Statutes**

Endangered Species Act, S.O. 2007, c.6

Fisheries Act, R.S.C., 1985, c. F-14
Fish and Wildlife Conservation Act, S.O. 1997, c. 41 - Ontario Regulation 664/98 - Fish Licensing
Species at Risk Act, S.C. 2002, c. 29

**Canadian and Provincial Policy**

Fisheries and Oceans Canada Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater
Fisheries and Oceans Canada Protocol for the Detection of Fish Species at Risk in Ontario Great Lakes Area (OGLA)
Fisheries and Oceans Canada Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)

## 182.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

**Aquatic Species at Risk** means a fish and/or a freshwater mussel species provincially or federally listed as extirpated, endangered, threatened species or species of special concern.

**Cofferdam** means a temporary enclosure constructed within a waterbody to allow the enclosed area to be pumped out, creating a dry work environment.

**Deleterious Substance** means as defined by the Fisheries Act.

**Entrainment** means when a fish is drawn into a water intake and cannot escape.

**Endangered Species Act Permit** means as defined by the Endangered Species Act.

**Fish** means as defined by the Fisheries Act.

**Fish Habitat** means as defined by the Fisheries Act.

**Fish Salvage** means the physical relocation of fish from the work area.

**Fish Screen** means a device designed to prevent fish from swimming or being drawn into a water intake pipe.

**Fisheries Act Authorization** means as defined by the Fisheries Act.

**Fisheries Assessment Specialist** means an individual who meets the requirements of the Fisheries Assessment specialty and is registered on MTO's Consultant Registry.

**Fisheries Contracts Specialist** means an individual who meets the requirements of the Fisheries Contracts specialty and is registered on MTO's Consultant Registry.

**Freshwater Mussel** means as defined by the Fisheries Act.

**High-Water Level** means the elevation of the top of the bank of the channel. In watercourses this refers to the "bank-full channel" which is often the 1:2 year flood flow return level. In inland lakes and wetlands, it refers to those parts of the waterbody bed and banks that are frequently flooded by water that leaves a mark on the adjacent land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation.

**Impingement** means when an entrapped fish is held in contact with the intake screen and is unable to free itself.

**In-Water Work** means any work, activity or undertaking occurring at or below the high-water level that may impact the waterbody bed or flow in the waterbody.

**In-Water Work Timing Windows** means a restriction to in-water work related to an activity during certain periods to protect fish and freshwater mussels from impacts of works or undertakings in and around waterbodies during critical life stages.

**Licence to Collect Fish for Scientific Purposes** means as defined in Part IV of Ontario Regulation 664/98, under the Fish and Wildlife Conservation Act.

**Mitigation Measures** means measures to reduce the spatial scale, duration, or intensity of harmful impacts to fish and fish habitat when such impacts cannot be avoided.

**Riparian Vegetation Areas** means trees, shrubs and other vegetation on waterbody bank from the high-water level upland for 30 metres.

**Sediment** means soils or other surface material transported by wind or water as a result of erosion.

**Species at Risk Act Permit** means as defined in the Species at Risk Act.

**Waterbody** means any permanent or intermittent, natural or constructed body of water including lakes, ponds, wetlands and watercourses.

**Waterbody Bank** means the land adjacent to a waterbody from the high-water level to the top of slope.

**Waterbody Bed** means the bottom and sides of the waterbody over which the water flows, up to the high-water level.

**Watercourse** means a stream, creek, river, or channel including ditches, in which the flow of water is permanent, intermittent, or ephemeral.

## 182.04 DESIGN AND SUBMISSION REQUIREMENTS

### 182.04.01 Submission Requirements

#### 182.04.01.01 Licences and Permits

A Licence to Collect Fish for Scientific Purposes shall be obtained from the Ontario Ministry of Natural Resources and Forestry (MNRF) to conduct a fish salvage prior to any in-water works.

Copies of all permits and licences obtained from regulatory agencies shall be submitted to the Contract Administrator upon receipt.

#### 182.04.01.02 Fisheries Specialists

When a fisheries specialist(s) is required, the name(s) of the fisheries contracts specialist(s) and, if applicable, fisheries assessment specialist(s), shall be provided to the Contract Administrator a minimum of 10 Business Days prior to the commencement of work at each location where specialist oversight is specified.

## 182.05 MATERIALS

All Materials used to provide environmental protection shall not contain any deleterious substances.

## 182.06 EQUPIMENT

All Equipment used for the work in and around waterbodies or on waterbody banks shall at all times be free of excess or leaking fuel, lubricants, coolant and any other deleterious substances that could enter the waterbody.

## 182.07 CONSTRUCTION

### 182.07.01 General Requirements

In addition to the environmental protection requirements specified elsewhere in the Contract Documents, all Work shall be controlled to provide effective waterbody and fish habitat protection. If fish are observed in the work area during construction the work shall cease, and the fish salvaged.

The Work shall be according to all mitigation measures specified in the Contract Documents.

Unless specified in the Contract Documents, waterbodies shall not be permanently diverted, relocated, blocked, or filled.

Unless specified in the Contract Documents, the removal of woody debris, rocks, sand or other materials from the waterbody bed and banks shall not be permitted.

When practicable, work shall be scheduled to avoid wet or windy periods that may increase erosion and sedimentation.

### 182.07.02 Operation of Equipment in and around Waterbodies or on Waterbody Banks

Equipment shall arrive on site in clean condition and is to be maintained free of fluid leaks.

Unless specified in the Contract Documents, Equipment shall not enter a waterbody and shall be operated on dry land above the high-water level, on ice, or from a floating barge in a manner that minimizes disturbance to the waterbody banks.

Equipment refueling and maintenance shall take place at locations as far away as practicable from a waterbody and in a manner that prevents any sediment and other deleterious substances from entering a waterbody. An emergency spill kit shall be kept on site to address any fluid leaks or spills from Equipment.

### 182.07.03 Dewatering and Temporary Flow Control

Dewatering and/or temporary flow control shall be according to OPSS 517.

### 182.07.04 Preservation of Riparian Vegetation

Riparian vegetation removal shall be no more than one third (1/3) of the total woody riparian vegetation within 30 metres of the high-water level of a waterbody. Vegetative root masses found within the waterbody banks shall remain undisturbed unless specified in the Contract Documents.

Existing trails, roads or cut lines shall be used wherever possible as access routes to avoid disturbance to waterbody banks and riparian vegetation areas. Equipment travel paths, stockpile areas and staging areas, within the vicinity of the crossing, shall be established to minimize impacts to riparian vegetation.

When practicable, riparian vegetation in the right-of-way shall be altered by hand.

**182.07.05 Erosion and Sediment Control**

The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 804 and OPSS 805.

Erosion and sediment control measures shall be in place prior to any soil disturbance and shall remain effective at all times, including seasonal and other shut down periods.

Site isolation measures (i.e. cofferdams, turbidity curtains) shall be installed prior to any in-water work activities taking place and shall remain effective at all times to allow the Contractor to work in a manner that prevents sediment from entering into a waterbody.

Measures for managing water being pumped and/or diverted from the site shall be according to OPSS 517.

**182.07.01 Restoration of Disturbed Areas**

All disturbed areas shall be immediately restored after a disturbance or upon completion of the work in or around waterbodies, waterbody banks, and riparian vegetation areas. The disturbed areas shall be restored to an equivalent or better condition than existed prior to the commencement of construction.

All disturbed areas on waterbody banks and riparian vegetation areas shall be stabilized with effective temporary erosion and sediment control measures as specified in the Contract Documents and maintained until vegetation is established.

All vegetative cover shall be applied as specified in the Contract Documents and according to OPSS 803.

Materials for the restoration of waterbody beds shall not be obtained from below the high-water level of any waterbody unless specified in the Contract Documents.

**182.07.07 Contaminant and Spills Management**

All stockpiled materials, including but not limited to excavated overburden and topsoil, excess materials, construction debris and containers shall be stored and stabilized in a manner that prevents them from entering any waterbody.

All materials such as paint, primers, blasting abrasives, concrete, rust, solvents, degreasers, grout, or other chemicals shall not enter a waterbody.

All building materials used in and around a waterbody or on waterbody banks shall be handled and treated in a manner to prevent the release or leaching of substances into a waterbody that may be deleterious to fish.

All waste materials (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) shall be contained and stabilized above the high-water level of nearby waterbodies to prevent re-entry.

**182.07.08 Fish Protection**

**182.07.08.01 Timing of In-Water Works**

All in-water work construction activities shall comply with the in-water works timing windows specified in the Contract Documents.

**182.07.08.02 Fish Salvage**

Fish stranded by the Work or found in the work area during construction shall be salvaged and relocated according to the Licence to Collect Fish for Scientific Purposes, unless specified in the Contract Documents. If fish cannot be safely relocated, the local MNRF office shall be consulted prior to fish salvage commencing to determine a suitable relocation site.

Fish exclusion measures (i.e. block nets) shall be used to prevent fish from re-entering work areas. If the fish exclusion measures fail, additional fish salvage activities shall be performed to relocate the fish from the work areas prior to recommencing construction. All fish exclusion measures shall be removed once the works in the area has been completed.

All fish shall be handled as little as possible and in a manner that minimizes stress and shall prevent the death of fish.

All persons conducting electrofishing shall possess a valid Ontario Electrofishing Certification.

**182.07.08.03 Reporting Species at Risk**

When an aquatic species at risk (protected under the federal Species at Risk Act (SARA) or the Ontario Endangered Species Act (ESA) is incidentally captured during fish salvage activities, the individual that incidentally captured the aquatic species at risk shall take a digital photograph according to Fisheries and Oceans Canada's Protocol for the Detection of Fish Species at Risk in Ontario Great Lakes Area (OGLA). Once the digital photograph has been taken, the species shall be released immediately. The digital photograph shall be reported and emailed to the Contract Administrator and the appropriate regulatory agency, (i.e. MECP for ESA, and Fisheries and Oceans Canada (DFO) for SARA).

All mortalities of species protected under SARA or ESA associated with the fish salvage activities shall be reported to the Contract Administrator, and the appropriate regulatory agency, immediately upon being discovered. Mortalities shall be vouchered according to Fisheries and Oceans Canada Protocol for the Detection of Fish Species at Risk in Ontario Great Lakes Area (OGLA) and/or Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA).

**182.07.08.04 Fish Screens**

Any water intakes or outlet pipes in fish bearing waters shall have screens to prevent entrainment or impingement of fish and shall follow the measures as outlined in Fisheries and Oceans Freshwater Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater.

**182.07.05 Fisheries Specialist Services**

When oversight by a fisheries specialist is required for a location as specified in the Contract Documents, a fisheries contracts specialist shall be retained to provide the following services.

a) Work with construction personnel to protect fish and fish habitat;

b) Work with construction personnel in the development of waterbody and fisheries protection strategies and plans, when specified in the Contract Documents;

c) Liaise with the Owner, the Contract Administrator, and, as necessary, Regulatory Agency representatives regarding Fisheries Act authorization requirements;

d) Be on-site to inspect the installation, function and decommissioning (as appropriate) of all temporary and permanent mitigation measures as specified in the Contract Documents and including providing field fit advice and necessary corrective actions for issues of non-compliance;

e) Inspect erosion and sediment control measures within 24 hours after a rain event;

f) Provide immediate notification to the Contractor and Contract Administrator of any release of a deleterious substance or any unauthorized harmful impacts to fish or where there is imminent danger to fish or any of these potentially occurring;

g) Complete and submit all monitoring documentation as specified in Table 1;

h) Fish salvage, as necessary, under a Licence to Collect Fish for Scientific Purposes; and

i) Review Change Proposals for compliance with the Fisheries Act. If a fisheries assessment is required, it shall be conducted by a fisheries assessment specialist.

**182.07.09 Contingency Measures**

When an environmental protection measure is found to be ineffective, corrective actions shall be taken immediately including repair or replacement of the measure to ensure waterbody and fish habitat protection.

**182.07.10 Management of Excess Materials**

Management of excess material shall be according to the Contract Documents.

**182.10 BASIS OF PAYMENT**

Payment at the Contract price for the appropriate tender items that require fisheries protection and mitigation measures shall include full compensation for all labour, Equipment, and Material to do the work.

**TABLE 1**
**Fisheries Contracts Specialist - Monitoring Documentation**

| MTO Documentation Name | Warrant for Completion | Distribution |
|---|---|---|
| Construction Inspection Checklist | Every day that a fisheries contracts specialist is on site. | Within 1 Business Day of inspection, submit one (1) electronic copy of the inspection checklist to Contract Administrator. |
| Non - Compliance Summary Form | Friday of each week when the Contractor is not in compliance with waterbody and fish habitat protection measures, conditions of a Fisheries Act authorization, Endangered Species Act permit, or Species at Risk Act permit, as specified in the Contract Documents. | By the following Monday, submit one (1) electronic copy of the non-compliance summary to Contract Administrator. |
| Construction Monitoring Report | Annually on multi-year construction projects and prior to the completion of construction as specified in the Fisheries Act authorization or unless otherwise specified in the Contract Documents. | Unless specified otherwise in the Contract Documents, by November 15 of the monitoring year, submit one (1) electronic copy of the draft report to Contract Administrator.<br><br>Unless specified otherwise in the Contract Documents, by December 15 of the monitoring year, submit one (1) electronic copy and one (1) hard copy of the final report incorporating MTO comments on the draft to Contract Administrator. |

# CONSTRUCTION SPECIFICATION FOR VEGETATIVE COVER

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## 803.01 SCOPE

This specification covers the requirements for the application of vegetative cover.

## 803.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

**Ontario Provincial Standard Specifications, Construction**

OPSS 206 Grading
OPSS 802 Topsoil
OPSS 804 Temporary Erosion Control
OPSS 805 Temporary Sediment Control

**Canadian and Provincial Statutes**

Seeds Act (R.S., 1985, c. S-8)
Invasive Species Act (S.O. 2015)
Weed Control Act (R.S.O., 1990, c.W.5)

## 803.03 DEFINITIONS

For the purposes of this specification the definitions in OPSS 182 and the following definitions shall apply:

**Invasive Species** means as defined in the Invasive Species Act.

**Local Seed Bank** means the seeds of species native to a project site and the topsoil the seeds are contained in, located within a vegetated area.

**Local Vegetation Block** means a salvaged layer of topsoil containing grass and herbaceous plant material that has a dense, intact root structure.

**Northern Ontario** means the area of Ontario north of a line joining Waubaushene, Severn Bridge, Bancroft and Ottawa.

**Noxious Vegetation** means a plant that has been listed in the Schedule of Noxious Weeds found in Regulation 1096 made under the Weed Control Act.

**Seeded Earth Area** means the prepared earth area that has received the applied seed and fertilizer.

**Southern Ontario** means the area of Ontario between the northern and southern boundaries of Southwestern Ontario and Northern Ontario respectively.

**Southwestern Ontario** means the area of Ontario south of a line joining Grand Bend and Clarkson.

**Vegetative Cover** means seed, sod, local seed bank, and local vegetation blocks.

**Winter dormant period** means as defined in Table 3 and 4 for the specified vegetative cover.

## 803.04 DESIGN AND SUBMISSION REQUIREMENTS

### 803.04.01 Submission Requirements

A certificate of seed analysis from a seed testing laboratory approved by the Canadian Food Inspection Agency for all permanent seed mixes to be used in the Work shall be submitted to the Contract Administrator for review a minimum of 24 hours prior to any seeding operations.

The certificate of seed analysis shall identify the seed supplier's lot designation numbers, germination and purity for each seed species of the mix, as well as the seed mix composition expressed as a percentage of each seed species by mass for each seed mix as specified in the Contract Documents.

## 803.05 MATERIALS

### 803.05.01 Seed

#### 803.05.01.01 Certificate of Seed Analysis

Permanent seed mixes shall have a valid certificate of seed analysis.

#### 803.05.01.02 Seed Packaging, Labeling, and Storage

All permanent seed mixes and annual nurse crop seeds shall be in the original factory sealed package with the original label securely attached.

Labeling shall be in accordance with the requirements of the Seeds Act and Regulations. Each package shall be labeled to show:

a) The name and address of the seed supplier.

b) The name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass of each.

c) The grade of the seed or seed mix.

d) The supplier's lot designation number corresponding to the certificate of seed analysis.

e) Mass in kilograms of the seed mix.

f) The inoculant type, strain, and expiry date.

All seed and inoculant shall be stored in cool, dry locations until use. Inoculant is only required for permanent seed mixes containing crown vetch or birdsfoot trefoil.

**803.05.01.03 Permanent Seed Mixes**

Permanent seed mixes shall be according to Table 1.

**803.05.01.04 Annual Nurse Crop Seed**

Annual nurse crop seed shall be fall rye grain, Canada wild rye, Virginia wild rye, or winter wheat grain species according to b) in the Seed Packaging, Labeling, and Storage clause.

**803.05.02 Seed Fertilizer**

Fertilizer shall be supplied in original factory sealed bags bearing the manufacturer's original label indicating mass and analysis. All fertilizer shall be in granular form being dry, free flowing, free from lumps, and according to Table 2.

**803.05.03 Local Seed Bank**

Local seed bank shall be sourced on-site from designated salvage areas as specified in the Contract Documents and shall not contain invasive species.

**803.05.04 Local Vegetation Blocks**

Local vegetation blocks shall be sourced on-site from designated salvage areas as specified in the Contract Documents and shall not contain invasive species.

**803.06 EQUIPMENT**

**803.06.01 Hydraulic Seeder**

The hydraulic seeder shall be capable of mixing the materials into a homogeneous slurry and maintaining the slurry in a homogeneous state until it is applied. The discharge pumps and gun nozzles shall be capable of applying the materials uniformly over the specified area. A hose extension for the hydraulic seeder shall be on site and available for use for areas outside of the range of the gun nozzle. Equipment shall provide constant agitation to prevent seed and slurry from clogging equipment.

The seeding equipment shall be calibrated to provide the coverage shown in Table 2.

**803.06.02 Drill Seeder**

The drill seeder shall be a pasture or rangeland type. It shall accommodate the seed sizes and weight of seed to be applied using as many compartments as required. Seeds of compatible size and weight may be mixed and placed in the same compartment.

**803.06.03 Mechanical Seeder**

A manually operated mechanical or broadcast seeder may be used for smaller or inaccessible locations as specified in the Contract Documents, or as approved by the Contract Administrator.

## 803.07 CONSTRUCTION

### 803.07.01 General

When placement of vegetative cover is required on a waterbody bank, material from the waterbody bank shall not enter the waterbody during preparation or grading of the waterbody bank.

#### 803.07.01.01 Control of Spread of Invasive Species and Noxious Vegetation

Work shall occur in a manner to prevent the spread of invasive species and noxious vegetation to, from and within the Working Area.

Soil from areas impacted by invasive species shall not be stockpiled for reuse.

Debris including earth clods and invasive and noxious vegetation material attached to the outside surfaces of equipment is prohibited from entering the Working Area. Equipment coming on site shall be inspected as close to the site entrance as possible for debris. If present, debris shall be completely removed prior to the equipment proceeding to the Working Area and shall be collected and managed by disposal to a licensed waste disposal site as non-hazardous solid industrial waste prior to the equipment proceeding to the Working Area.

Equipment shall also be inspected for debris prior to leaving the Working Area. Any debris shall be removed and managed as specified above, and in a manner that prevents equipment from coming into further contact with standing, sprayed or cut invasive or noxious vegetation.

### 803.07.02 Seeding

#### 803.07.02.01 General

Seed shall not enter any waterbodies.

The seeding operation shall not commence until the Contract Administrator has accepted that the surface preparation is according to OPSS 802 and the layout of seed mix locations are as specified in the Contract Documents.

Seeding on final grade shall occur prior to the application of temporary erosion control according to OPSS 804, unless the Contract Administrator approves the simultaneous application of seeding and temporary erosion control.

Seed applications or re-applications shall not be carried out under adverse weather conditions such as high wind or heavy rain or when field conditions are not conducive to seed germination such as frozen soil or soil covered with snow, ice, or standing water.

Where advanced seeding around high-risk areas is specified in the Contract Documents, seed and temporary erosion control shall be applied within 48 hours of final grade.

Seeding shall overlap the adjoining established ground cover by 300 mm.

**803.07.02.01 Surface Preparation for Seeding**

The surface to be seeded shall be prepared according to OPSS 802 and not more than five Days prior to the seeding operation.

At the time of seeding, all surface areas designated for seeding shall exhibit no evidence of erosion and shall be uniformly cultivated to a minimum depth of 50 mm.

**803.07.02.02 Layout for Seeding**

Seeding areas shall be staked out as specified in the Contract Documents.

**803.07.02.03 Application Rates for Seed, Fertilizer, and Water**

Application rates for permanent seed mixes, annual nurse crop seed, and fertilizer shall be as shown in Table 2.

**803.07.02.03.01 Hydraulic Seeding**

There shall be a uniform dispersal of the mixed material over the entire area designated for seeding. The spray shall not dislodge soil or cause erosion.

**803.07.02.03.02 Drill Seeding**

Seeds shall be applied uniformly over the specified area at a depth of 6 mm to 8 mm and shall be applied along the contours of the ground.

**803.07.02.03.03 Mechanical Seeding**

Seeds shall be sown in two directions with 50% of the seed applied with each direction. The application of these two directions shall be perpendicular to each other.

After application of seeds is complete, they shall be covered by raking and/or chain harrowing. If soil is uneven soil may be rolled with roller not exceeding 50 kg where conditions warrant.

Once the seed is covered the area shall be watered to a minimum depth of 50 mm. The application of water shall not cause movement of seeds or erosion.

**803.07.02.04 Cleanup**

When seed is applied to the foliage of trees, shrubs, or other susceptible plant material, the seed shall be immediately removed from the trees, shrubs, or plant material, and the trees, shrubs, and plant material washed with clean water.

When seed is applied to areas or objects other than those designated, the seed shall be removed from the areas and objects.

**803.07.03 Sodding**

**803.07.03.01 Fertilizer Application for Sodding**

Fertilizer shall be applied uniformly to the surface area designated for sodding, a maximum of 48 hours prior to sod placement, at the rate specified on its bag by the manufacturer.

**803.07.03.02 Sod Placement**

The locations specified for placement of sod shall be prepared and graded prior to placement according to OPSS 206.

Sod shall not be separated from its mineral soil base and not damaged during transportation, handling, and placement.

Sod shall be securely placed lengthwise across the face of slopes and parallel to the centreline of ditches in the locations as specified in the Contract Documents. Voids shall not be left between the soil portion of the sod and the underlying ground surface. Sod shall be countersunk to existing grade level at all edges.

End joints of adjacent sod pieces shall be staggered. The edges of adjacent sod pieces shall be placed tightly against one another without overlapping. Joints shall be tamped to a uniform surface. Sod shall be placed up to the subgrade elevation on the roadway front slope.

Where required, sod shall be staked to the grade to avoid movement.

**803.07.03.03 Maintenance of Completed Sodding**

Sod shall be maintained for 30 Days following placement. During this period, the placed sod shall be kept actively growing and green in colour. This requirement shall be suspended during the specified winter dormant period.

**803.07.04 Local Seed Bank Salvage**

Local seed bank shall be salvaged prior to the specified winter dormant period.

Designated salvage areas for local seed bank shall be excavated to a depth of 150 mm to 300 mm or as specified in the Contract Documents.

**803.07.04.01 Local Seed Bank Stockpiles**

Salvaged local seed bank may be stockpiled for storage in locations specified in the Contract Documents or as approved by the Contract Administrator for up to six months if it cannot be installed on designated receiving sites immediately.

Local seed bank stockpiles shall not be placed in areas with invasive or noxious vegetation and shall not exceed 1500 mm in height. Machinery shall not be allowed on stockpiles. Compaction of stockpiles shall be avoided.

Local seed bank stockpiles shall be kept moist to prevent seeds from drying out during storage.

To prevent soil erosion and contamination by weeds during storage local seed bank stockpiles shall be covered with tarps or apply temporary erosion control according to OPSS 804.

Light duty sediment barrier according to OPSS 805 shall be installed around the entire base of local seed bank stockpiles.

**803.07.04.02 Local Seed Bank Installation**

Salvaged local seed bank shall be installed on designated receiving sites as specified in the Contract Documents immediately, when practicable.

If any designated receiving area is subsequently re-graded after installation of local seed bank, additional local seed bank shall be salvaged and installed according to this specification.

Should local seed bank no longer be available, vegetative cover and temporary erosion control shall be applied to the area according to this specification and OPSS 804 respectively.

**803.07.05 Local Vegetation Blocks**

**803.07.05.01 Local Vegetation Block Harvest and Installation**

The locations specified for placement of local vegetation blocks shall be prepared and graded prior to placement as specified in the Contract Documents and according to OPSS 206.

Local vegetation blocks shall remain intact and undamaged during harvesting and installation.

Local vegetation blocks shall be mechanically harvested from and installed at the locations as specified in the Contract Documents on the same Day, or otherwise within 24h hours, and prior to the winter dormant period. Local vegetation blocks shall be sized as specified in the Contract Documents.

After harvesting, seed and temporary erosion control shall be applied to the source location of the vegetation blocks according to this specification and OPSS 804 respectively.

**803.07.06 Protection of Waterbodies and Waterbody Banks**

Protection of waterbodies and waterbody banks shall be as specified in the Contract Documents.

**803.07.07 Management of Excess Material**

Management of excess material shall be as specified in the Contract Documents.

**803.08 QUALITY ASSURANCE**

**803.08.01 Seeding**

**803.08.01.01 Acceptance Criteria for Seeding**

An inspection shall take place a minimum of 60 Days after the application of any seed. If application is completed too late in the year to achieve the performance measures after 60 Days, then the inspection will take place a minimum of 60 Days after the end of the specified winter dormant period.

Southwestern and Southern Ontario:

The following criteria shall be met for acceptance during the inspection:

a) The annual nurse crop shall be evident at mature height in an evenly dispersed, uniform ground cover.

b) Germination of the specified permanent seed species shall be visually evident in an evenly dispersed uniform ground cover.

c) A total of 65% of the total area shall be covered with permanent seeded species.

d) Bare areas shall not exceed 10% of the total seeded area.

Northern Ontario:

The following criteria shall be met for acceptance during the inspection:

a) The annual nurse crop shall be evident in an evenly dispersed, uniform ground cover.

b) Germination of the specified permanent seed species shall be visually evident in an evenly dispersed uniform ground cover.

c) A total of 50% of the total area shall be covered with permanent seeded species.

d) Bare areas shall not exceed 10% of the total seeded area.

Inspections shall not be made when site conditions prohibit a visual field inspection.

**803.08.01.02 Failure to Meet Acceptance**

If the completed work does not meet the acceptance criteria, written notification of the failed areas will be provided by the Contract Administrator. The specified permanent seed mixes and annual nurse crop seed shall be re-applied according to this specification within 14 Days of receipt of the notification, or within 14 Days of the end of the specified winter dormant period.

Upon reapplication of the specified permanent seed mixes and annual nurse crop seed the areas that did not previously meet acceptance will be inspected until the requirements in the Acceptance Criteria for Seeding clause have been achieved.

Locations that are specified in the Contract Documents to receive vegetative cover, that fail to meet the acceptance criteria specified in the Quality Assurance section by the winter dormant period, or where vegetative cover has not been applied prior to the winter dormant period, shall be protected from erosion according to OPSS 804 until vegetative cover can be applied or reapplied.

**803.08.02 Sodding**

**803.08.02.01 Acceptance of Sod**

After the 30 Days maintenance period has ended, the Contract Administrator shall inspect all placed sod based on the requirements specified in the Maintenance of Completed Sodding clause. If placement of sod is completed less than 30 Days prior to the start of the winter dormant period, then the inspection will take place 30 Days after the end of the winter dormant period.

The sod shall be in the same location as originally placed and shall not have moved, eroded, slipped, or sloughed. Sod shall show evidence of rooting into the underlying soil. The sod shall be of sufficient density that no surface soil is visible and there shall be no competitive growth, emerging from the sod or from between the sod joints.

**803.08.02.02 Failure to Meet Acceptance**

When the work does not meet the requirements specified herein, written notification will be provided by the Contract Administrator, and sod shall be reapplied according to this specification within 14 Days of receipt of the notification.

The site shall be maintained, and temporary erosion control will be provided OPSS 804 until the sod has been replaced.

Upon replacement of sod in the locations that did not previously meet acceptance will be inspected until the requirements in the Acceptance of Sod clause have been achieved.

**803.09 MEASUREMENT FOR PAYMENT**

**803.09.01 Actual Measurement**

**803.09.01.01 Seed**

Measurement shall be by area in square metres following the contours of the ground.

**803.09.01.02 Sod**

Measurement shall be by area in square metres following the contours of the ground.

**803.09.01.03 Local Seed Bank**

Measurement shall be by area in square metres following the contours of the ground.

**803.09.01.04 Local Vegetation Blocks**

Measurement shall be by area in square metres following the contours of the ground.

**803.09.02 Plan Quantity Payment**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clause under Actual Measurement.

**803.10 BASIS OF PAYMENT**

**803.10.01 Seed – Item**
**Sod – Item**

Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment, and Material to do the work.

Progress payments shall be based on the following percentages of the Contract price for milestones accepted by the Contract Administrator:

a) 50% for installation

b) 50% upon acceptance.

**803.10.02 Local Seed Bank – Item**
**Local Vegetation Blocks - Item**

Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment, and Material to do the work.

**TABLE 1**
**Permanent Seed Mixes and Seed Certificate Analysis Values**

| Permanent Seed Mix | Grade Name | Minimum Seed Germination % | Minimum Seed Purity % | Maximum Weed Seed % | Seed Mix % | Seed Species Composition % |
|---|---|---|---|---|---|---|
| **Standard Roadside Mix** | **Canada #1 Lawn Grass Seed Mixture** | **70** | **85** | **0.5** | | |
| Creeping Red Fescue: *Festuca rubra* | | | | | 52 | 45 to 60 |
| Kentucky Bluegrass: *Poa pratensis* | | | | | 10 | 5 to 15 |
| Perennial Ryegrass: *Lolium perrenne* | | | | | 35 | 30 to 40 |
| White Clover: *Trifolium repens* | | | | | 3 | 2 to 7 |
| | | | | | | |
| **Modified Native Standard Roadside Mix** | **Canada #1 Lawn Grass Seed Mixture** | **70** | **85** | **0.5** | | |
| Creeping Red Fescue: *Festuca Rubra* | | | | | 60 | 45 to 60 |
| Canada Bluegrass: *Poa compressa* | | | | | 10 | 5 to 15 |
| Colonial Bentgrass: *Agrostis capillaris* | | | | | 10 | 5 to 15 |
| Intermediate Ryegrass: Lolium hybridum | | | | | 20 | 15 to 25 |
| **Crown Vetch Mix** | **Common #1 Ground Cover** | **70** | **N/A** | **0.5** | | |
| Creeping Red Fescue: *Festuca rubra* | | | | | 66 | 62 to 70 |
| Crown Vetch: *Coronilla varia* inoculated seed | | | | | 34 | 30 to 38 |
| | | | | | | |
| **Birdsfoot Trefoil Mix** | **Common #1 Forage Mixture** | **75** | **N/A** | **0.5** | | |
| Creeping Red Fescue: *Festuca rubra* | | | | | 66 | 62 to 70 |
| Birdsfoot Trefoil: *Lotus corniculatus* inoculated seed | | | | | 34 | 30 to 38 |

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| Permanent Seed Mix | Grade Name | Minimum Seed Germination % | Minimum Seed Purity % | Maximum Weed Seed % | Seed Mix % | Seed Species Composition % |
|---|---|---|---|---|---|---|
| **Salt Tolerant Mix** | **Canada #1 Ground Cover** | **70** | **85** | **0.5** | | |
| Tall Fescue: *Festuca arundinacea* | | | | | 25 | 20 to 30 |
| Fults Alkali Grass: *Puccinellia distans* | | | | | 20 | 15 to 25 |
| Creeping Red Fescue: *Festuca rubra* | | | | | 25 | 15 to 30 |
| Perennial Ryegrass: *Lolium perrenne* | | | | | 20 | 15 to 25 |
| Hard Fescue: *Festuca trachyphylla* | | | | | 10 | 5 to 15 |
| | | | | | | |
| **Lowland Mix** | **Canada #1 Ground Cover** | **70** | **N/A** | **0.5** | | |
| Creeping Red Fescue: *Festuca rubra* | | | | | 35 | 30 to 40 |
| Brome Grass: *Bromus nerres* | | | | | 25 | 20 to 30 |
| Kentucky Bluegrass: *Poa pratensis* | | | | | 10 | 5 to 15 |
| Birdsfoot Trefoil: *Lotus corniculatus* inoculated seed | | | | | 5 | 3 to 7 |
| White Clover: *Trifolium repens* | | | | | 5 | 3 to 7 |
| Perennial Ryegrass: *Lolium perrenne* | | | | | 20 | 15 to 25 |

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| Permanent Seed Mix | Grade Name | Minimum Seed Germination % | Minimum Seed Purity % | Maximum Weed Seed % | Seed Mix % | Seed Species Composition % |
|---|---|---|---|---|---|---|
| **Acidic Soil Mix** | **Canada #1 Ground Cover** | **70** | **N/A** | **0.5** | | |
| Birdsfoot Trefoil: *Lotus corniculatus* inoculated seed | | | | | 30 | 25 to 40 |
| Red Top: *Agrostis gigantea* | | | | | 10 | 5 to 15 |
| Tall Fescue: *Festuca arundinacea* | | | | | 15 | 10 to 20 |
| Creeping Red Fescue: *Festuca rubra* | | | | | 30 | 25 to 35 |
| Hard Fescue: *Festuca trachyphylla* | | | | | 5 | 3 to 7 |
| Alsike Clover: *Trifolium hybridum* | | | | | 5 | 3 to 7 |
| Red Clover: *Trifolium pratense* | | | | | 5 | 3 to 7 |
| | | | | | | |
| **Northern Ontario Mix** | **Canada #1 Ground Cover** | **70** | **N/A** | **0.5** | | |
| Red Top: *Agrostis gigantean* | | | | | 3 | 1 to 5 |
| Canada Bluegrass: *Poa compressa* | | | | | 7 | 5 to 15 |
| Creeping Red Fescue: *Festuca rubra* | | | | | 40 | 35 to 45 |
| Birdsfoot Trefoil: *Lotus corniculatus* inoculated seed | | | | | 5 | 2 to 8 |
| Alsike Clover: *Trifolium hybridum* | | | | | 3 | 1 to 5 |
| White Clover: *Trifolium repens* | | | | | 2 | 1 to 5 |
| Perennial Rye Grass: *Lolium perrenne* | | | | | 30 | 25 to 35 |
| Meadow Fescue: *Festuca pratensis* | | | | | 10 | 5 to 15 |

**TABLE 2**
**Application Rates for Seed and Fertilizer**

| Permanent Seed Mixes | Permanent Seed Mix Rate kg/10,000 m² | Fertilizer Rate minimum 200 kg/ha | | | Nurse Crop Rate kg/10,000 m² |
|---|---|---|---|---|---|
| | | 8-32-16 | 0-46-0 | 0-0-60 | |
| **Standard Roadside Mix** | 170 | 365 | | | 60 |
| **Crown Vetch Mix** | 140 | 365 | 260 | | 60 |
| **Modified Native Standard Roadside Mix** | 170 | 365 | | | 60 |
| **Birdsfoot Trefoil Mix** | 140 | 365 | 260 | | 60 |
| **Salt Tolerant Mix** | 170 | 350 | | | 60 |
| **Lowland Mix** | 170 | 350 | | | 60 |
| **Acidic Soil Mix** | 170 | 350 | 220 | 220 | 60 |
| **Northern Ontario Mix** | 170 | 365 | | | 60 |

**TABLE 3**
**Winter Dormant Period – Seed and Local Seed Bank Salvage**

| SOUTHWESTERN ONTARIO | SOUTHERN ONTARIO | NORTHERN ONTARIO |
|---|---|---|
| November 15 to April 15 inclusive | November 1 to April 30 inclusive | October 1 to June 1 inclusive |

**TABLE 4**
**Winter Dormant Period – Sod and Local Vegetation Blocks**

| SOUTHWESTERN ONTARIO | SOUTHERN ONTARIO | NORTHERN ONTARIO |
|---|---|---|
| November 15 to April 15 inclusive | November 1 to April 30 inclusive | Oct 15 to May 15 inclusive |

# CONSTRUCTION SPECIFICATION FOR TEMPORARY SEDIMENT CONTROL

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## 805.01 SCOPE

This specification describes the requirements for the installation, maintenance, and removal of temporary sediment control during construction.

## 805.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

**Ontario Provincial Standard Specifications, Construction**

OPSS 206 Grading
OPSS 517 Dewatering
OPSS 803 Vegetative Cover
OPSS 804 Temporary Erosion Control

**Ontario Provincial Standard Specifications, Material**

OPSS 1860 Geotextiles

## 805.03 DEFINITIONS

For the purpose of this specification, the definitions in OPSS 182 and the following definitions apply:

**Earth** means as defined in OPSS 206.

**Erosion** means as defined in OPSS 804.

**Fibre Roll** means as defined in OPSS 804.

**Significant Rainfall** means as defined in OPSS 804.

**Sediment** means as defined in OPSS 804.

**Sediment Barrier** means a barrier used to trap sediment in overland flow.

**Turbidity Barrier** means turbidity curtains or turbidity dams used to isolate the Working Area to prevent the release of sediment and debris from the Working Area into the surrounding waterbody.

**Turbidity Curtain** means a flexible barrier used to trap sediment in waterbodies.

**Turbidity Dam** means a non-flexible barrier used to trap sediment in waterbodies.

**Temporary Sediment Control** means control of sediment produced by erosion some distance away from the sediment source using sediment barriers, bags and traps and turbidity barriers.

## 805.05 MATERIALS

### 805.05.02 Geosynthetics

#### 805.05.02.01 Geotextile

Geotextile shall be free of holes, tears, and punctures.

#### 805.05.02.02 Sediment Fence Geotextile

Geotextile for sediment fence shall be according to OPSS 1860, Table 3.

Geotextile for sediment fence may be separate from the stakes used to install it as a sediment barrier.

#### 805.05.02.03 Berm Barrier Geotextile

Geotextile for berm barriers and rock flow check dams shall be a woven, Class II geotextile according to OPSS 1860. The filtration opening size (FOS) shall be no greater than 300 µm.

#### 805.05.02.04 Turbidity Curtain Geosynthetic

Turbidity curtain geosynthetics shall have a grab tensile strength of at least 990 N, according to OPSS 1860 and be one of geotextile or geomembrane.

Geotextile shall be a woven material. The FOS shall be no greater than 300 µm, according to OPSS 1860.

Geomembrane shall be a low-permeability synthetic material or a geotextile impregnated with elastomeric spray.

**805.05.02.05 Filter Bags**

Geotextile for filter bags shall be non-woven, polypropylene, Class I according to Table 1 of OPSS 1860 or as specified in the Contract Documents.

**805.05.03 Plastic Sheeting**

Plastic sheeting shall be according to OPSS 804.

**805.05.04 Stakes**

Stakes shall be of sufficient strength and length to satisfy temporary sediment control installation, performance and maintenance requirements.

**805.05.05 Wire Fence**

Wire fence used in wire-backed sediment fence barrier shall be 1.63 mm diameter galvanized steel fence with a 5 cm by 10 cm weave and a 0.91 m height.

**805.05.05.01 Posts**

Posts to support wire-backed sediment fence barriers shall be metal T-posts. Metal ties shall be used to secure the sediment fence to the metal T-posts.

**805.05.06 Berm Barriers**

Berm barriers shall be constructed using non-erodible earth or organic materials such as, sand, gravel, brush or compost.

**805.05.07 Sandbags**

Sandbags shall be made from heavy gauge plastic, agricultural burlap, or sediment fence geotextile. Heavy gauge plastic shall contain stabilizers or inhibitors resistant to deterioration by ultraviolet radiation. Sandbags shall be filled with clean sand, 19 mm gravel or 6 mm pea gravel, containing no silt or clay.

**805.05.08 Fibre Rolls**

Fibre rolls shall be according to OPSS 804.

**805.05.09 Turbidity Curtain**

Turbidity curtain shall be weighted at the bottom to ensure that sediment does not travel under the curtain. Turbidity curtain shall be supported at the top through a flotation system.

**805.05.09 Turbidity Dam**

Turbidity dams shall be constructed with materials specified in the Contract Documents.

**805.07 CONSTRUCTION**

**805.07.01 General**

**805.07.01.02 Protection of Stockpiled Materials**

All stockpiles of erodible construction materials, and excess or surplus materials, shall be protected from sediment transport within 48 hours of being built unless as specified in the Contract Documents.

**805.07.01.03 Dewatering**

Dewatering shall be according to OPSS 517.

**805.07.01.04 Turbidity Curtains and Turbidity Dams**

Equipment shall not be operated in a waterbody outside a turbidity curtain or turbidity dam other than hand held equipment or boats, unless specified in the Contract Documents.

**805.07.01.05 Construction and Removal of Measures**

The timing of construction and removal of temporary sediment control shall be as specified in the Contract Documents.

**805.07.02 Light-Duty Sediment Barriers, General**

Light-duty sediment barriers are sediment fence barriers, or fibre roll barriers.

Light-duty sediment barriers shall be constructed as specified in the Contract Documents.

Light-duty sediment barriers shall not be installed in or across waterbodies.

When the Light-Duty Sediment Barrier item is specified in the Contract Documents, any light-duty sediment barriers may be used. When a specific light-duty sediment barrier is specified in the Contract Documents, no substitution shall be permitted.

Light- duty sediment barriers shall be installed such that soil scour and erosion is prevented at the low points of the barrier on the downslope side.

**805.07.02.02 Sediment Fence Barriers**

Sediment fence barriers shall not have plastic or wire mesh backing.

Sediment fence barriers shall be constructed as specified in the Contract Documents and according to the following:

a) Within a trench excavated along the contour of the ground such that the elevation of the above ground portion of the fence is the same along its entire length except at the ends.

b) Without breaks or gaps along their entire length.

c) On flat ground with a minimum offset of 2 m from the toe of the slope being protected. When a longer sediment barrier is required, additional sediment fence barriers shall be installed as specified in the Contract Documents.

d) With the geotextile attached firmly, without sagging, to the upslope side of the stakes and the stakes spaced to ensure the geotextile remains vertical.

e) With the geotextile joined to provide a continuous run, with the ends overlapped a minimum of 500 mm and securely fastened to the stakes using cable ties or soft wire at the top of the geotextile only.

f) With the geotextile angled upslope at the ends of each run in a “J” pattern and so that the ends are at a higher elevation than the bottom of the run.

When geotextile is supplied without stakes attached, the geotextile shall be installed into the trench in the ground first, the stakes shall be driven into the ground behind the geotextile, and the geotextile shall be attached to the upslope side of the stakes using cable ties or soft wire at the top of the geotextile only.

**805.07.02.03 Fibre Roll Barriers**

Fibre roll barriers shall be sized and constructed as specified in the Contract Documents and according to the following:

a) Along the contour of the ground into trenches that have been excavated into the soil perpendicular to the slope face to a depth of approximately one half the roll diameter across the width of the slope unless otherwise specified by the manufacturer of a commercial product.

b) After any rills and gullies on the slope where fibre roll barriers are to be installed have been filled in.

c) On flat ground with a minimum offset of 2 m from the toe of the slope being protected. When a longer sediment barrier is required, additional fibre roll barriers shall be installed tightly butted against each other as specified in the Contract Documents.

d) With their base in continuous contact with the underlying soil along their entire length without gaps and angled upslope at end of each run in a “J” pattern.

e) With the ends of adjacent fibre roll segments tightly butted against each other without being overlapped vertically or horizontally.

After placement, a metal bar shall be used to make pilot holes perpendicular to the slope face through the centre of the fibre rolls as specified in the Contract Documents. Pilot holes shall also be made at the ends of each fibre roll segment angled towards the next abutting fibre roll to hold adjacent rolls together.

Wooden stakes shall be driven into the pilot holes as specified in the Contract Documents.

Soil excavated from the trenches shall be placed along the upslope side of the fibre rolls and compacted into the front of the trench to minimize possible undermining by runoff.

The soil on the upslope and downslope sides of the fibre rolls shall be seeded as specified in the Contract Documents and according to OPSS 803.

**805.07.03 Heavy-Duty Sediment Barriers, General**

Heavy-duty sediment barriers are wire-backed sediment fence barriers, berm barriers, or sandbag barriers.

Heavy-duty sediment barriers shall be constructed as specified in the Contract Documents, without gaps and without undermining to prevent sediment passage through, under, or around the barrier.

When the Heavy-Duty Sediment Barrier item is specified in the Contract Documents, the option is available to select any of the heavy-duty sediment barriers or any combination of them. When a specific heavy-duty sediment barrier is specified in the Contract Documents, no substitution shall be permitted.

Heavy-duty sediment barriers shall be installed such that soil scour and erosion is prevented at the low points of the barrier on the downslope side.

**805.07.03.01 Wire-Backed Sediment Fence Barriers**

Wire-backed sediment fence barriers shall not be used for perimeter control or property line delineation unless specified in the Contract Documents.

Wire-backed sediment fence barriers shall be constructed as specified in the Contract Documents and according to the following:

a) Within a trench excavated along the contour of the ground such that the elevation of the bottom of the fence is the same along its entire length except at the ends.

b) Without breaks or gaps along their entire length.

c) On flat ground with a minimum offset of 2 m from the toe of the slope being protected. When a longer sediment barrier is required, additional wire-backed sediment fence barriers shall be installed as specified in the Contract Documents.

d) With the wire fence installed into the trench first, the geotextile installed next on the upslope side of the wire fence and T-posts installed into the ground behind the geotextile and wire fence and spaced to ensure the geotextile and wire fence remain vertical.

e) With the geotextile and the wire fence attached securely to the T-posts using wire ties at the top of the geotextile and wire fence only.

f) With the geotextile and the wire fence joined to provide a continuous run, with their ends overlapped a minimum of 500 mm, and securely fastened to T-posts using wire ties at the top of the geotextile or wire fence only.

g) With the wire-backed sediment fence angled upslope at the ends of each run in a “J” pattern and so that the ends are at a higher elevation than the bottom of the run.

**805.07.03.02 Berm Barriers**

Berm barriers shall be constructed and wrapped in geotextile or plastic sheeting as specified in the Contract Documents unless they are constructed using compost. The geotextile or plastic sheeting shall be secured to the ground.

**805.07.03.03 Sandbag Barriers**

Sandbags shall be securely tied at the top.

Sandbag barriers shall be constructed as specified in the Contract Documents.

Sandbags within each row shall be placed with the sides of the bags butted tightly against one another without gaps. The ends of sandbags in adjacent rows shall be butted tightly against one another without gaps.

When sandbag barriers are constructed on earth surfaces, they shall be placed into an excavated trench, backfilled with excavated material to existing grade and compacted.

When sandbag barriers are to be constructed on sod, erosion control blanket, existing turf, or bedrock, they shall be placed so there are no gaps between the sandbags and the underlying surface.

Sandbag barriers shall be maintained with undamaged bags that are firmly seated.

**805.07.04 Sediment Trap in Ditch**

Sediment traps in a ditch shall be constructed as specified in the Contract Documents to prevent sediment transport from the upstream to the downstream side of the trap and so that the majority of the sediment is collected in the excavated basin.

Sediment traps shall be constructed as a single control measure consisting of an excavated basin and a rock flow check dam according to OPSS 804.

**805.07.05 Sediment Traps for Dewatering**

Sediment traps for dewatering shall be according to OPSS 517 and as specified in the Contract Documents.

A sediment barrier shall be constructed as specified in the Contract Documents and according to this specification to completely surround the sediment trap for dewatering with its ends overlapping a minimum of 500 mm where they meet. The rock flow check dam shall be constructed according to OPSS 804 and be located at the low point of the sediment barrier.

A temporary construction fence shall be erected around the sediment trap to restrict public access.

**805.07.06 Filter Bags**

Filter bags, hoses and pumps shall be sized appropriately to the volume of water to be filtered as specified in the Contract Documents. Bags shall have a FOS as specified in the Contract Documents.

Filter bags shall be situated in a vegetated area or placed on a permeable surface on a slight slope with the opening of the bag facing upslope a minimum of 30 m away from waterbodies and sensitive environmental receptors or as far as practicable from the top of the bank of any waterbody.

All filter bags shall be completely surrounded at their perimeter by a sediment barrier constructed according to this specification with its ends overlapping a minimum of 500 mm where they meet.

The opening of the filter bag shall be securely attached with mechanical connections to the discharge hose using commercially available hose couplers and placed in the retention facility to be dewatered.

Discharge of water from filter bags shall be according to OPSS 517.

A filter bag shall be replaced when trapped sediment has accumulated to 50% of the bag capacity or in accordance with the manufacturer's recommendations.

**805.07.07 Turbidity Barriers**

Turbidity barriers shall be constructed as specified in the Contract Documents, without gaps and without undermining to prevent turbid water from passing through, under, or around the barriers.

**805.07.07.01 Turbidity Curtains**

Turbidity curtains shall be constructed as specified in the Contract Documents.

Turbidity curtains shall not be used across flowing watercourses.

Turbidity curtains shall be free of tears and gaps. The bottom edge of the curtain shall be in continuous and secured contact with the waterbody bed to prevent sediment passage from the enclosed area.

Turbidity curtains shall be constructed according to the following:

a) Turbidity curtains shall be oriented parallel to the direction of flow to the greatest extent possible.

b) Turbidity curtains shall be firmly anchored in place. The alignment of the curtain shall be set as close to the Working Area as possible but not so close as to be disturbed by construction equipment.

c) The height of turbidity curtains shall be 20% greater than the depth of the water where they are to be installed to allow for water level fluctuations.

d) The area that turbidity curtains protect shall not contain large culverts or drainage areas that if flows occur behind the curtain it would cause a breach or lost contact with the waterbody bed at the bottom surface of the curtain.

e) When water depths at the design alignment are minimal, the toe of the curtain may be anchored in place by staking. Supplemental anchors of the toe of the curtain shall be used, as needed, depending on water surface disturbances such as from boats and wave action.

f) Shallow installations may be made by securing the top of the curtain using staking rather than a flotation system.

**805.07.07.02 Turbidity Dam**

Turbidity dams shall be constructed as specified in the Contract Documents.

**805.07.08 Monitoring and Documentation**

All temporary sediment control shall be monitored to ensure it is effective. Monitoring shall be completed for the following conditions:

a) A minimum of every seven Days.

b) The 24 hours prior to a forecasted significant rainfall event.

c) Within 24 hours after significant rainfall events.

Monitoring shall include the following:

a) Visual inspection of the condition and effectiveness of all installed temporary sediment controls; and

b) Visual inspection for sediment leaving the Working Area and for entering waterbodies and sensitive environmental receptors.

Observations shall be documented and any concerns such as observed breaches of temporary sediment control, or sediment transport to a waterbody, sensitive receptor or private property shall be reported immediately to the Contract Administrator. Monitoring documentation shall be provided to the Contract Administrator upon request within 24 hours.

**805.07.09 Maintenance**

All temporary sediment control constructed under this specification shall be maintained in an effective, functioning, stable condition.

When temporary sediment control is found to be ineffective at any location, a different material, product or method more suitable for the site conditions shall be selected, installed and maintained within 48 hours.

**805.07.09.01 Sediment Removal**

Sediment contained by temporary sediment control shall be removed and managed as specified in the Contract Documents in a manner that avoids escape of the sediment to the downstream side and avoids damage to the temporary erosion control materials or products. Sediment shall be removed to the level of the grade existing at the time the temporary sediment control was constructed and be according to the following:

a) For light-duty sediment barriers, accumulated sediment shall be removed once it reaches the lesser of the following:

   i. A depth of one-half the effective height of the sediment barrier.
   ii. A depth of 300 mm immediately upstream of the sediment barrier.

b) For heavy-duty sediment barriers, sediment traps in ditches, and sediment traps for dewatering, accumulated sediment shall be removed once it reaches one-half the effective height or depth of the sediment barrier or trap.

c) For sediment traps for dewatering, sediment shall be removed when sediment diminishes the storage volume by 50%.

d) For all temporary sediment control, accumulated sediment shall be removed as necessary to perform maintenance repairs.

e) Accumulated sediment shall be removed immediately prior to the final removal of the temporary sediment control.

**805.07.10 Removal**

Temporary sediment control shall be removed, and associated excavations backfilled and compacted when the area being protected has been completely stabilized by final cover placement. When the final cover is vegetated and placement could not be advanced to allow establishment and stabilization of the site prior to Contract Completion, temporary sediment control shall be left in place.

Temporary sediment control shall also be removed without entry of equipment to any waterbody other than hand-held equipment or boats as may be required, and in a manner that minimizes release of sediment and debris to any waterbody, sensitive receptor or private property.

Prior to removal of in-water turbidity barriers, any sediment laden water shall be allowed to settle out or be pumped out of the area enclosed by the turbidity barrier.

Any existing, seed, sod, temporary erosion control, or final design cover disturbed by removal or backfilling of temporary sediment control and removal of accumulated sediment, shall be brought to final grade and restored as specified in the Contract Documents.

Filter bags that have reached capacity or are no longer in use, and any captured sediment within the filter bag or its light-duty sediment barrier enclosure shall be managed as excess material as specified in the Contract Documents.

**805.07.11 Protection of Waterbodies and Sensitive Environmental Receptors**

Protection of waterbodies, waterbody banks and sensitive environmental receptors shall be as specified in the Contract Documents.

**805.07.12 Management of Excess Material**

Management of excess material shall be according to the Contract Documents.

## 805.08 QUALITY ASSURANCE

**805.08.01 Acceptance of Temporary Sediment Control**

The acceptance of temporary sediment control shall be according to the requirements of this specification and, as specified in the Contract Documents. Acceptance for each type of temporary sediment control shall be determined through visual inspection by the Contract Administrator and random quality assurance checks by the Owner.

The Owner may conduct random quality assurance checks on temporary sediment control that has been installed or removed to verify they are in accordance with the requirements of this specification, and as specified in the Contract Documents.

Temporary sediment control that is identified by the Owner as deficient shall be removed and replaced or reapplied with measures that meet the requirements of this specification and, as specified in the Contract Documents. Removal and replacement or reapplication shall be carried out at no additional cost to the Owner within 48 hours of the Owner providing notice to the Contractor, unless otherwise agreed to in writing.

## 805.09 MEASUREMENT FOR PAYMENT

**805.09.01 Actual Measurement**

**805.09.01.01 Light-Duty Sediment Barriers**
**Sediment Fence Barriers**
**Fibre Roll Barriers**
**Heavy-Duty Sediment Barriers**
**Wire-Backed Sediment Fence Barriers**
**Berm Barriers**
**Sandbag Barriers**

Measurement shall be the length in linear metres from end to end of the barrier, following the contours of the ground.

**805.09.01.02 Sediment Traps in Ditch**
**Sediment Traps for Dewatering**
**Filter Bags**

For measurement purposes, a count shall be made of the number of sediment traps in a ditch, sediment traps for dewatering and filter bags constructed or installed. Component parts shall not be counted separately for payment.

**805.09.01.03 Turbidity Curtains**

Measurement of turbidity curtain shall be made in linear metres along its length from end to end between tie-downs for each turbidity curtain installed.

**805.09.01.04 Turbidity Dams**

For measurement purposes, a count shall be made of the number of turbidity dams constructed.

**805.09.02 Plan Quantity Measurement**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

**805.10 BASIS OF PAYMENT**

**805.10.01 Light-Duty Sediment Barriers - Item**
**Sediment Fence Barriers - Item**
**Fibre Roll Barriers - Item**
**Heavy-Duty Sediment Barriers - Item**
**Wire-Backed Sediment Fence Barriers - Item**
**Berm Barriers - Item**
**Sandbag Barriers - Item**
**Sediment Traps in Ditch - Item**
**Sediment Traps for Dewatering - Item**
**Filter Bags - Item**
**Turbidity Curtains - Item**
**Turbidity Dams - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material required to do the work.

Progress payments for the sediment control measures shall be made as follows:

a) 30% for initial construction.

b) 50% for maintenance.

c) 20% for removal.

# Appendix D
# Vascular Plant Lists for ELC Communities

VEGETATION COMMUNITY CLASSIFICATION: G057Tt

COMMUNITY #: 1

LOCATION: Petawawa

COORDINATES: 45.9007632, -77.251325

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Balsam Fir | Abies balsamea | Pinaceae | -3 | 5 | | | S5 |
| Black Cherry | Prunus serotina var. serotina | Rosaceae | 3 | 3 | | | S5 |
| Bracken Fern | Pteridium aquilinum | Dennstaedtiaceae | 3 | 2 | | | S5 |
| Bunchberry | Cornus canadensis | Cornaceae | 0 | 7 | | | S5 |
| Canada Fly Honeysuckle | Lonicera canadensis | Caprifoliaceae | 3 | 6 | | | S5 |
| Common Winterberry | Ilex verticillata | Aquifoliaceae | -3 | 5 | | | S5 |
| Early Lowbush Blueberry | Vaccinium angustifolium | Ericaceae | 3 | 6 | | | S5 |
| Eastern Teaberry | Gaultheria procumbens | Ericaceae | 3 | 6 | | | S5 |
| Eastern White Pine | Pinus strobus | Pinaceae | 3 | 4 | | | S5 |
| Goldthread | Coptis trifolia | Ranunculaceae | -3 | 7 | | | S5 |
| Hobblebush | Viburnum lantanoides | Caprifoliaceae | 0 | 8 | | | S5 |
| Northern Red Oak | Quercus rubra | Fagaceae | 3 | 6 | | | S5 |
| Northern Starflower | Lysimachia borealis | Primulaceae | 0 | 6 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Partridgeberry | Mitchella repens | Rubiaceae | 3 | 6 | | | S5 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Royal Fern | Osmunda regalis var. spectabilis | Osmundaceae | -5 | 7 | | | S5 |
| Sheep Laurel | Kalmia angustifolia var. angustifolia | Ericaceae | 0 | 9 | | | S5 |
| Smooth Serviceberry | Amelanchier laevis | Rosaceae | 5 | 5 | | | S5 |
| Striped Maple | Acer pensylvanicum | Aceraceae | 3 | 7 | | | S4 |

NOTES: Red Maple dominates with Red Oak, and white pine

VEGETATION COMMUNITY CLASSIFICATION: G057Tt

COMMUNITY #: 1

LOCATION: Petawawa

COORDINATES: 45.9007632, -77.251325

PROJECT NUMBER: 11757-001

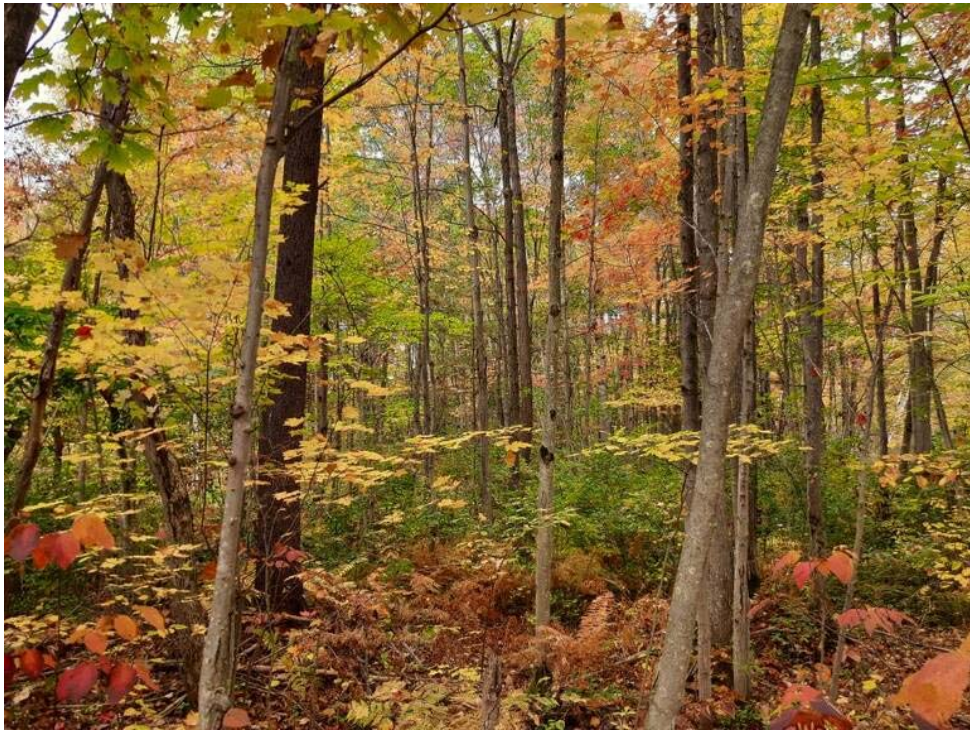
DATE: October 07, 2021

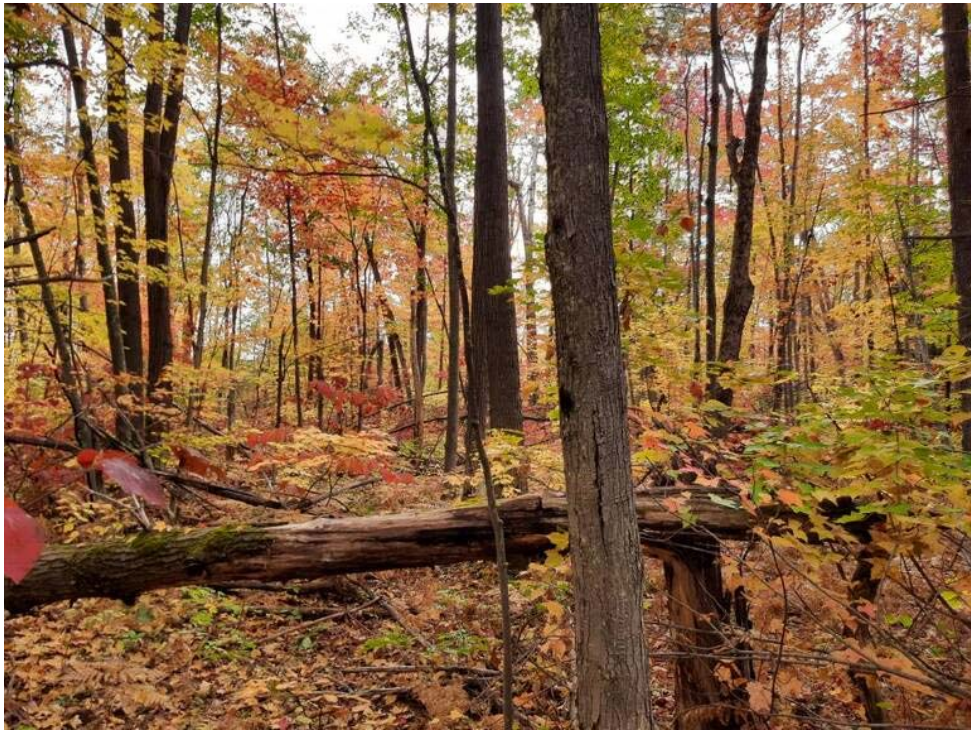
PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:





VEGETATION COMMUNITY CLASSIFICATION: G131Tt

COMMUNITY #: 2

LOCATION: Petawawa

COORDINATES: 45.9001771, -77.2508693

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Balsam Fir | Abies balsamea | Pinaceae | -3 | 5 | | | S5 |
| Black Ash | Fraxinus nigra | Oleaceae | -3 | 7 | | | S3 |
| Broad-leaved Cattail | Typha latifolia | Typhaceae | -5 | 1 | | | S5 |
| Common Winterberry | Ilex verticillata | Aquifoliaceae | -3 | 5 | | | S5 |
| Dwarf Raspberry | Rubus pubescens | Rosaceae | -3 | 4 | | | S5 |
| Goldthread | Coptis trifolia | Ranunculaceae | -3 | 7 | | | S5 |
| Ostrich Fern | Matteuccia struthiopteris | Dryopteridaceae | 0 | 5 | | | S5 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Rough-stemmed Goldenrod | Solidago rugosa | Asteraceae | 0 | 4 | | | S5 |
| Royal Fern | Osmunda regalis var. spectabilis | Osmundaceae | -5 | 7 | | | S5 |
| Sensitive Fern | Onoclea sensibilis | Dryopteridaceae | -3 | 4 | | | S5 |
| Silver Maple | Acer saccharinum | Aceraceae | -3 | 5 | | | S5 |
| Tamarack | Larix laricina | Pinaceae | -3 | 7 | | | S5 |
| Wild Raisin | Viburnum nudum var. cassinoides | Caprifoliaceae | -3 | 7 | | | S5 |
| Yellow Birch | Betula alleghaniensis | Betulaceae | 0 | 6 | | | S5 |

NOTES: Red Maple with Black Ash

VEGETATION COMMUNITY CLASSIFICATION: G131Tt

COMMUNITY #: 2

LOCATION: Petawawa

COORDINATES: 45.9001771, -77.2508693

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G149N

COMMUNITY #: 3

LOCATION: Petawawa

COORDINATES: 45.8988373, -77.2512003

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Bebb's Willow | Salix bebbiana | Salicaceae | -3 | 4 | | | S5 |
| Common Winterberry | Ilex verticillata | Aquifoliaceae | -3 | 5 | | | S5 |
| Narrow-leaved Cattail | Typha angustifolia | Typhaceae | -5 | | | | SNA |
| Purple Loosestrife | Lythrum salicaria | Lythraceae | -5 | | | | SNA |
| Sheep Laurel | Kalmia angustifolia var. angustifolia | Ericaceae | 0 | 9 | | | S5 |
| Speckled Alder | Alnus incana ssp. rugosa | Betulaceae | -3 | 6 | | | S5 |

NOTES: Cattail dominated.

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G133Tt

COMMUNITY #: 4

LOCATION: Petawawa

COORDINATES: 45.8988373, -77.2512003

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Black Ash | Fraxinus nigra | Oleaceae | -3 | 7 | | | S3 |
| Broad-leaved Cattail | Typha latifolia | Typhaceae | -5 | 1 | | | S5 |
| Bunchberry | Cornus canadensis | Cornaceae | 0 | 7 | | | S5 |
| Common Labrador Tea | Rhododendron groenlandicum | Ericaceae | -5 | 9 | | | S5 |
| Common Winterberry | Ilex verticillata | Aquifoliaceae | -3 | 5 | | | S5 |
| Dwarf Raspberry | Rubus pubescens | Rosaceae | -3 | 4 | | | S5 |
| Early Lowbush Blueberry | Vaccinium angustifolium | Ericaceae | 3 | 6 | | | S5 |
| Eastern White Cedar | Thuja occidentalis | Cupressaceae | -3 | 4 | | | S5 |
| Eastern White Pine | Pinus strobus | Pinaceae | 3 | 4 | | | S5 |
| Fringed Sedge | Carex crinita var. crinita | Cyperaceae | -5 | 6 | | | S5 |
| Northern Red Oak | Quercus rubra | Fagaceae | 3 | 6 | | | S5 |
| Ostrich Fern | Matteuccia struthiopteris | Dryopteridaceae | 0 | 5 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Purple-stemmed Aster | Symphyotrichum puniceum var. puniceum | Asteraceae | -5 | 6 | | | S5 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Sensitive Fern | Onoclea sensibilis | Dryopteridaceae | -3 | 4 | | | S5 |
| Sheep Laurel | Kalmia angustifolia var. angustifolia | Ericaceae | 0 | 9 | | | S5 |
| Speckled Alder | Alnus incana ssp. rugosa | Betulaceae | -3 | 6 | | | S5 |
| White Spruce | Picea glauca | Pinaceae | 3 | 6 | | | S5 |
| Wild Raisin | Viburnum nudum var. cassinoides | Caprifoliaceae | -3 | 7 | | | S5 |

NOTES: Cedar with red maple mixed swamp. Deep organic soils.

VEGETATION COMMUNITY CLASSIFICATION: G133Tt

COMMUNITY #: 4

LOCATION: Petawawa

COORDINATES: 45.8988373, -77.2512003

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G135S

COMMUNITY #: 5

LOCATION: Petawawa

COORDINATES: 45.9009507, -77.2540686

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Common Winterberry | Ilex verticillata | Aquifoliaceae | -3 | 5 | | | S5 |
| Ostrich Fern | Matteuccia struthiopteris | Dryopteridaceae | 0 | 5 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Purple Loosestrife | Lythrum salicaria | Lythraceae | -5 | | | | SNA |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Royal Fern | Osmunda regalis var. spectabilis | Osmundaceae | -5 | 7 | | | S5 |
| Sheep Laurel | Kalmia angustifolia var. angustifolia | Ericaceae | 0 | 9 | | | S5 |
| Speckled Alder | Alnus incana ssp. rugosa | Betulaceae | -3 | 6 | | | S5 |
| Wild Raisin | Viburnum nudum var. cassinoides | Caprifoliaceae | -3 | 7 | | | S5 |

NOTES: Alder Thicket Swamp.

VEGETATION COMMUNITY CLASSIFICATION: G135S

COMMUNITY #: 5

LOCATION: Petawawa

COORDINATES: 45.9009507, -77.2540686

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G057Tt

COMMUNITY #: 6

LOCATION: Petawawa

COORDINATES: 45.9015445, -77.2503477

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Allegheny Blackberry | Rubus allegheniensis | Rosaceae | 3 | 2 | | | S5 |
| Alternate-leaved Dogwood | Cornus alternifolia | Cornaceae | 3 | 6 | | | S5 |
| Arrow-leaved Aster | Symphyotrichum urophyllum | Asteraceae | 5 | 6 | | | S4 |
| Black Cherry | Prunus serotina var. serotina | Rosaceae | 3 | 3 | | | S5 |
| Bracken Fern | Pteridium aquilinum | Dennstaedtiaceae | 3 | 2 | | | S5 |
| Downy Arrowwood | Viburnum rafinesqueanum | Caprifoliaceae | 5 | 7 | | | S5 |
| Early Lowbush Blueberry | Vaccinium angustifolium | Ericaceae | 3 | 6 | | | S5 |
| Eastern White Pine | Pinus strobus | Pinaceae | 3 | 4 | | | S5 |
| Large-leaved Aster | Eurybia macrophylla | Asteraceae | 5 | 5 | | | S5 |
| Large-toothed Aspen | Populus grandidentata | Salicaceae | 5 | 5 | | | S5 |
| Northern Red Oak | Quercus rubra | Fagaceae | 3 | 6 | | | S5 |
| Ostrich Fern | Matteuccia struthiopteris | Dryopteridaceae | 0 | 5 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Smooth Serviceberry | Amelanchier laevis | Rosaceae | 5 | 5 | | | S5 |
| Spinulose Wood Fern | Dryopteris carthusiana | Dryopteridaceae | -3 | 5 | | | S5 |
| Striped Maple | Acer pensylvanicum | Aceraceae | 3 | 7 | | | S4 |
| Wild Sarsaparilla | Aralia nudicaulis | Araliaceae | 3 | 4 | | | S5 |
| Yellow Birch | Betula alleghaniensis | Betulaceae | 0 | 6 | | | S5 |

NOTES: Red oak dominant

VEGETATION COMMUNITY CLASSIFICATION: G057Tt

COMMUNITY #: 6

LOCATION: Petawawa

COORDINATES: 45.9015445, -77.2503477

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G134S

COMMUNITY #: 7

LOCATION: Petawawa

COORDINATES: 45.9024917, -77.2485734

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Bebb's Willow | Salix bebbiana | Salicaceae | -3 | 4 | | | S5 |
| Bittersweet Nightshade | Solanum dulcamara | Solanaceae | 0 | | | | SNA |
| Broad-leaved Cattail | Typha latifolia | Typhaceae | -5 | 1 | | | S5 |
| Common Winterberry | Ilex verticillata | Aquifoliaceae | -3 | 5 | | | S5 |
| Common Woolly Bulrush | Scirpus cyperinus | Cyperaceae | -5 | 4 | | | S5 |
| Crack Willow | Salix euxina | Salicaceae | 0 | | | | SNA |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Red Ash | Fraxinus pennsylvanica | Oleaceae | -3 | 3 | | | S4 |
| Reed Canarygrass | Phalaris arundinacea var. arundinacea | Poaceae | -3 | 0 | | | S5 |
| Sensitive Fern | Onoclea sensibilis | Dryopteridaceae | -3 | 4 | | | S5 |
| Speckled Alder | Alnus incana ssp. rugosa | Betulaceae | -3 | 6 | | | S5 |
| Sweet Gale | Myrica gale | Myricaceae | -5 | 6 | | | S5 |
| White Meadowsweet | Spiraea alba var. alba | Rosaceae | -3 | 3 | | | S5 |

NOTES: Willow thicket swamp.

VEGETATION COMMUNITY CLASSIFICATION: G134S

COMMUNITY #: 7

LOCATION: Petawawa

COORDINATES: 45.9024917, -77.2485734

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G131Tt

COMMUNITY #: 8

LOCATION: Petawawa

COORDINATES: 45.8250303, -77.1233251

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| (Acer rubrum X Acer saccharinum) | Acer x freemanii | Aceraceae | -5 | 6 | | | SNA |
| Black Chokeberry | Aronia melanocarpa | Rosaceae | -3 | 7 | | | S5 |
| Red Ash | Fraxinus pennsylvanica | Oleaceae | -3 | 3 | | | S4 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Royal Fern | Osmunda regalis var. spectabilis | Osmundaceae | -5 | 7 | | | S5 |
| Sensitive Fern | Onoclea sensibilis | Dryopteridaceae | -3 | 4 | | | S5 |
| Silver Maple | Acer saccharinum | Aceraceae | -3 | 5 | | | S5 |
| White Elm | Ulmus americana | Ulmaceae | -3 | 3 | | | S5 |

NOTES: Red Maple shares dominance with Silver Maple. Black Ash associate.

VEGETATION COMMUNITY CLASSIFICATION: G131Tt

COMMUNITY #: 8

LOCATION: Petawawa

COORDINATES: 45.8250303, -77.1233251

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G130Tt

COMMUNITY #: 9

LOCATION: Petawawa

COORDINATES: 45.9002215, -77.2473958

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Black Ash | Fraxinus nigra | Oleaceae | -3 | 7 | | | S3 |
| Common Winterberry | Ilex verticillata | Aquifoliaceae | -3 | 5 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Red Ash | Fraxinus pennsylvanica | Oleaceae | -3 | 3 | | | S4 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Royal Fern | Osmunda regalis var. spectabilis | Osmundaceae | -5 | 7 | | | S5 |
| Sensitive Fern | Onoclea sensibilis | Dryopteridaceae | -3 | 4 | | | S5 |
| Trembling Aspen | Populus tremuloides | Salicaceae | 0 | 2 | | | S5 |

NOTES: Trembling Aspen with Red Maple and Black Ash.

VEGETATION COMMUNITY CLASSIFICATION: G130Tt

COMMUNITY #: 9

LOCATION: Petawawa

COORDINATES: 45.9002215, -77.2473958

PROJECT NUMBER: 11757-001

DATE: October 07, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G054Tt

COMMUNITY #: 10

LOCATION: Petawawa

COORDINATES: 45.900785, -77.2522373

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Bracken Fern | Pteridium aquilinum | Dennstaedtiaceae | 3 | 2 | | | S5 |
| Early Lowbush Blueberry | Vaccinium angustifolium | Ericaceae | 3 | 6 | | | S5 |
| Eastern Teaberry | Gaultheria procumbens | Ericaceae | 3 | 6 | | | S5 |
| Eastern White Pine | Pinus strobus | Pinaceae | 3 | 4 | | | S5 |
| Northern Red Oak | Quercus rubra | Fagaceae | 3 | 6 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Smooth Serviceberry | Amelanchier laevis | Rosaceae | 5 | 5 | | | S5 |

NOTES: Red Oak with White Pine.

VEGETATION COMMUNITY CLASSIFICATION: G054Tt

COMMUNITY #: 10

LOCATION: Petawawa

COORDINATES: 45.900785, -77.2522373

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G029N

COMMUNITY #: 11

LOCATION: Petawawa

COORDINATES: 45.8978009, -77.2648342

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Alfalfa | Medicago sativa ssp. sativa | Fabaceae | 5 | | | | SNA |
| Allegheny Blackberry | Rubus allegheniensis | Rosaceae | 3 | 2 | | | S5 |
| Black-eyed Susan | Rudbeckia hirta var. pulcherrima | Asteraceae | 3 | 0 | | | S5 |
| Bladder Campion | Silene vulgaris | Caryophyllaceae | 5 | | | | SNA |
| Common Milkweed | Asclepias syriaca | Apocynaceae | 5 | 0 | | | S5 |
| Common Mullein | Verbascum thapsus ssp. thapsus | Scrophulariaceae | 5 | | | | SNA |
| Common Viper's Bugloss | Echium vulgare | Boraginaceae | 5 | | | | SNA |
| European Reed | Phragmites australis ssp. australis | Poaceae | -3 | | | | SNA |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Rabbit's-foot Clover | Trifolium arvense | Fabaceae | 5 | | | | SNA |
| Red Clover | Trifolium pratense | Fabaceae | 3 | | | | SNA |
| Red Raspberry | Rubus idaeus | Rosaceae | 3 | 2 | | | S5 |
| Smooth Brome | Bromus inermis | Poaceae | 5 | | | | SNA |
| Sweet-fern | Comptonia peregrina | Myricaceae | 5 | 7 | | | S5 |
| Tall Goldenrod | Solidago altissima | Asteraceae | 3 | 1 | | | S5 |
| Trembling Aspen | Populus tremuloides | Salicaceae | 0 | 2 | | | S5 |
| Tufted Vetch | Vicia cracca | Fabaceae | 5 | | | | SNA |
| Wild Carrot | Daucus carota | Apiaceae | 5 | | | | SNA |

NOTES: Cultural Meadow. Being mowed at the time of the survey. Contains old lagoons with phrag.

VEGETATION COMMUNITY CLASSIFICATION: G029N

COMMUNITY #: 11

LOCATION: Petawawa

COORDINATES: 45.8978009, -77.2648342

PROJECT NUMBER: 11757-001

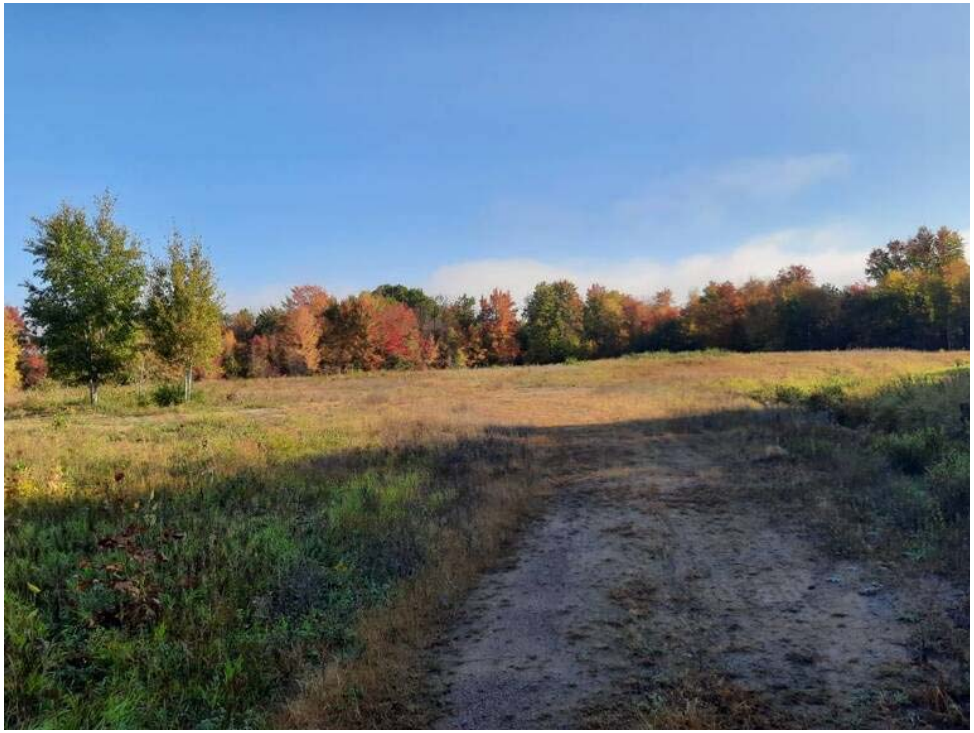
DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:



VEGETATION COMMUNITY CLASSIFICATION: G134S

COMMUNITY #: 12

LOCATION: Petawawa

COORDINATES: 45.8249445, -77.122574

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Broad-leaved Cattail | Typha latifolia | Typhaceae | -5 | 1 | | | S5 |
| Purple Loosestrife | Lythrum salicaria | Lythraceae | -5 | | | | SNA |
| Reed Canarygrass | Phalaris arundinacea var. arundinacea | Poaceae | -3 | 0 | | | S5 |
| Royal Fern | Osmunda regalis var. spectabilis | Osmundaceae | -5 | 7 | | | S5 |
| Sensitive Fern | Onoclea sensibilis | Dryopteridaceae | -3 | 4 | | | S5 |
| Silver Maple | Acer saccharinum | Aceraceae | -3 | 5 | | | S5 |
| Sweet Gale | Myrica gale | Myricaceae | -5 | 6 | | | S5 |

NOTES: Sweet Gale dominates.

VEGETATION COMMUNITY CLASSIFICATION: G134S

COMMUNITY #: 12

LOCATION: Petawawa

COORDINATES: 45.8249445, -77.122574

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G057Tt

COMMUNITY #: 13

LOCATION: Petawawa

COORDINATES: 45.8134611, -77.1222953

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Black Cherry | Prunus serotina var. serotina | Rosaceae | 3 | 3 | | | S5 |
| Climbing Bittersweet | Celastrus scandens | Celastraceae | 3 | 3 | | | S5 |
| Common Milkweed | Asclepias syriaca | Apocynaceae | 5 | 0 | | | S5 |
| Common Self-heal | Prunella vulgaris ssp. vulgaris | Lamiaceae | 0 | | | | SNA |
| Common Yarrow | Achillea millefolium | Asteraceae | 3 | | | | SNA |
| Eastern White Pine | Pinus strobus | Pinaceae | 3 | 4 | | | S5 |
| Northern Red Oak | Quercus rubra | Fagaceae | 3 | 6 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Red Ash | Fraxinus pennsylvanica | Oleaceae | -3 | 3 | | | S4 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Red Raspberry | Rubus idaeus | Rosaceae | 3 | 2 | | | S5 |
| Rough-stemmed Goldenrod | Solidago rugosa | Asteraceae | 0 | 4 | | | S5 |
| Smooth Serviceberry | Amelanchier laevis | Rosaceae | 5 | 5 | | | S5 |
| Virginia Clematis | Clematis virginiana | Ranunculaceae | 0 | 3 | | | S5 |

NOTES: Patch of deciduous fores at base of slope. Extends around edge of facility. Similar to Community 1.

VEGETATION COMMUNITY CLASSIFICATION: G057Tt

COMMUNITY #: 13

LOCATION: Petawawa

COORDINATES: 45.8134611, -77.1222953

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

VEGETATION COMMUNITY CLASSIFICATION: G058Tt

COMMUNITY #: 14

LOCATION: Petawawa

COORDINATES: 45.898416, -77.253745

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

| Common Name | Scientific Name | Family | CoW | CoC | SARA | SARO | S-Rank |
|---|---|---|---|---|---|---|---|
| Balsam Fir | Abies balsamea | Pinaceae | -3 | 5 | | | S5 |
| Balsam Poplar | Populus balsamifera | Salicaceae | -3 | 4 | | | S5 |
| Downy Arrowwood | Viburnum rafinesqueanum | Caprifoliaceae | 5 | 7 | | | S5 |
| Hobblebush | Viburnum lantanoides | Caprifoliaceae | 0 | 8 | | | S5 |
| Paper Birch | Betula papyrifera | Betulaceae | 3 | 2 | | | S5 |
| Red Maple | Acer rubrum | Aceraceae | 0 | 4 | | | S5 |
| Spinulose Wood Fern | Dryopteris carthusiana | Dryopteridaceae | -3 | 5 | | | S5 |
| Striped Maple | Acer pensylvanicum | Aceraceae | 3 | 7 | | | S4 |
| Wild Sarsaparilla | Aralia nudicaulis | Araliaceae | 3 | 4 | | | S5 |
| Yellow Birch | Betula alleghaniensis | Betulaceae | 0 | 6 | | | S5 |

NOTES: On steep slope. Red Maple dominates.

VEGETATION COMMUNITY CLASSIFICATION: G058Tt

COMMUNITY #: 14

LOCATION: Petawawa

COORDINATES: 45.898416, -77.253745

PROJECT NUMBER: 11757-001

DATE: October 08, 2021

PROJECT MANAGER: Matthew Wheeler

FIELD STAFF: Tyler Jamieson

FIELD SHEET – Vegetation Species List

VEGETATION COMMUNITY PHOTOS:

# Appendix E
# Clean Equipment Protocol for Industry to Prevent Introduction of Invasive Species

# Clean Equipment Protocol for Industry – Summary

Invasive species are plants, animals and microorganisms that have been accidentally or deliberately introduced into areas beyond their normal range, that out compete native species. Invasive species are a major threat to Ontario's natural areas, and are very costly to deal with once established.

Invasive species can be spread to new areas by contaminated mud, gravel, soil and plant materials on vehicles and machinery.

The best practice is to prevent the spread of invasive species. By inspecting and cleaning equipment and following some simple guidelines, the risk of spreading invasive plants is greatly reduced.

- Identify invasive plants and plan activities accordingly (i.e. schedule work in areas without invasive plants first, leaving infested areas til the end, to reduce the risk of unintentionally moving plants into a new area).
- Record & report sightings of invasive plants
  (Invading Species hotline at **1-800-563-7711** or online **www.invadingspecies.com/report/** or **www.eddmaps.org/Ontario**)
- Inspect vehicles and machinery before and after entering sites or conducting work along roadways & waterways.

## How to Inspect

Before leaving the site, inspect the vehicle thoroughly inside and out for where dirt, plant material and seeds may be lodged or stuck to interior and exterior surfaces. Remove and clean any guards, covers or plates that are easy to remove.

Pay attention to the underside of the vehicle, radiators, spare tires, foot wells and bumper bars. If clods of dirt, seed or other plant material are found, remove immediately and discard where the contamination occurred or in the garbage.

## When Cleaning is required

- Safely locate the vehicle and equipment away from any hazards, ensure engine is off and the vehicle or equipment is immobilized.
- Clean the vehicle/equipment in an appropriate area where contamination and seed spread is not possible (or limited).

  **The site should be:**

  - » Mud free, gravel covered hard surface, or, if this is not available, a well maintained grassy area.
  - » Gently sloping to assist in draining water and material away from the vehicle or equipment. Care should be taken to ensure that localized erosion will not be created.
  - » At least 30m away from any watercourse, water body and natural vegetation.
  - » Large enough to allow for adequate movement of larger vehicles and equipment.

**Continued...**

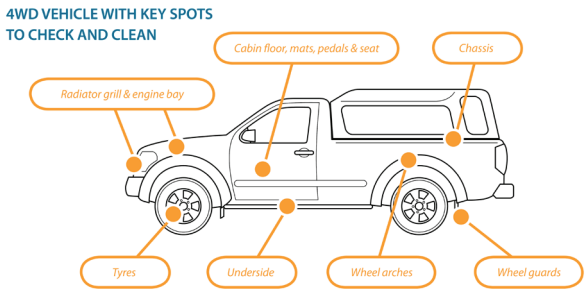
## Equipment Required

- [ ] A pump and high pressure hose OR High pressure water unit
- [ ] Air compressor and blower OR Vacuum
- [ ] Shovel
- [ ] Pry bar
- [ ] Stiff brush or broom

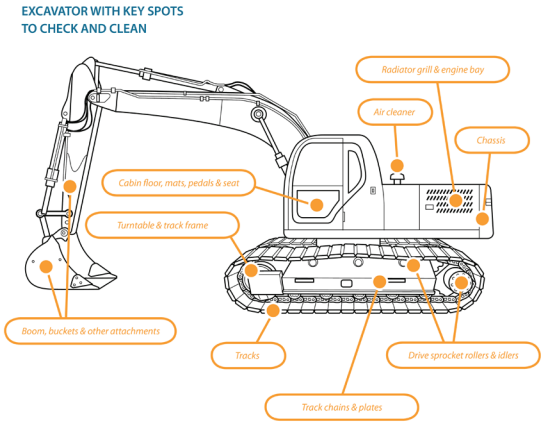
## Final Inspection Checklist

- [ ] No clods of dirt should be visible after cleaning.
- [ ] Radiators, grills and the interiors of vehicles should be free of accumulations of seed, soil, mud and plant material parts including seeds, roots, flowers, fruit and or stems.

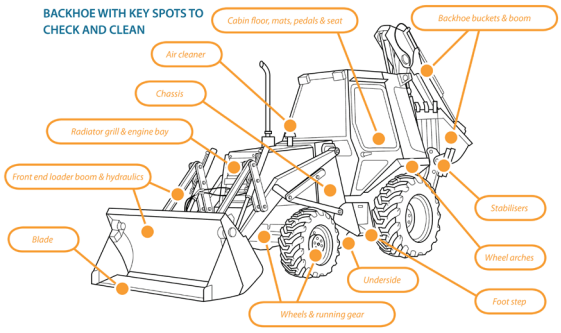
## 2WD and 4WD Vehicles



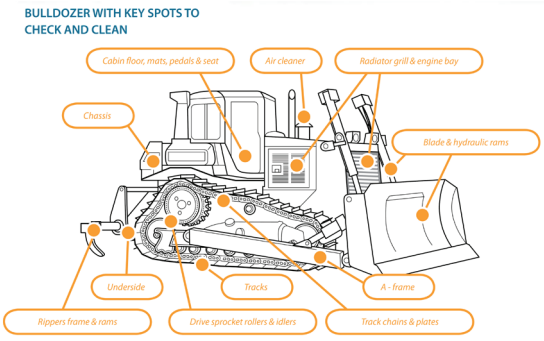

## Excavator




## Backhoe




## Bulldozer




Invasive Species Centre
Catalyst for research and response

Ontario

Peterborough County Stewardship

Ontario Invasive Plant Council